

# THE MEDICAL NEWS.

A WEEKLY JOURNAL OF MEDICAL SCIENCE.

VOL. 82.

NEW YORK, SATURDAY, MARCH 21, 1903.

No. 12.

## ORIGINAL ARTICLES.

### SOME TYPES OF RETINITIS AND CHORIO-RETINITIS.\*

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I SHALL ask you to-night to consider certain types of retinal and chorioidal disease which seem to be pretty well defined and are fairly common, yet which have received rather scant notice in our text-books. I do so the more readily because neither the etiology nor the pathology of these special types has been defined with absolute precision and there seems a good deal yet to learn regarding them; indeed, in many cases it has not been decided whether the process is primarily situated in the retina or in the chorioid, although ultimately, doubtless, both membranes are always involved.

*Focal Exudative Chorioretinitis.*—Every now and then we meet with a case with characters more or less resembling the following:

*Case I.*—Kate M., a woman of twenty or twenty-five years, came to the Ophthalmic and Aural Institute complaining simply of *muscae volitantes* before the left eye for the preceding three weeks. Right eye, normal. Vision  $\frac{20}{20}+$  with correction. In the left eye, outline of disc appears blurred and retina hazy; somewhat above and to the temporal side of the disc but not more than a papilla-breadth from it is an irregular, altogether ill defined, very brilliant, white acuminated mass over which courses a tortuous retinal vessel; this mass rises abruptly from the surrounding fundus and has a considerable elevation. There are no other patches in the fundus, which otherwise appears quite normal.

In the course of a week the spot had become much less white and appeared rather less prominent but more defined.

Cases of this sort, in which an isolated, often quite prominent exudate appears somewhere in the vicinity of the optic disc and without much inflammation either of the latter or of the rest of the fundus, occur not so very infrequently, especially in young people, and generally without any well defined cause. With rest and absorbent treatment they usually resolve pretty speedily, sometimes within two or three weeks, and often leave no bad results behind, except, it may be, a partial scotoma.

These cases are usually thought to be chorioidal in origin, the retina being involved only secondarily, yet we sometimes find the retina involved very markedly from the first, and possibly there may be cases in which the process is retinal from the start. The following case was one in which the retina was thus prominently involved.

*Case II.*—A. B., a man of twenty years, came to the Ophthalmic and Aural Institute complaining that the

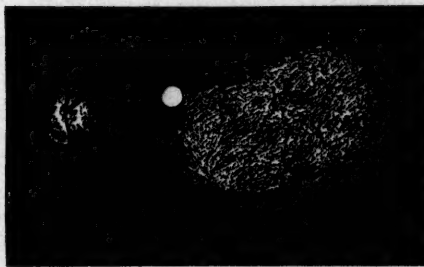
sight of the left eye had been blurred for two weeks. Left eye,  $V=\frac{20}{10}$ , when first seen; three days later,  $\frac{20}{100}$ . Slight blurring of the outlines of the disc and moderate engorgement of the vessels. Between the disc and the macula and just below a line connecting the two, is a hazy, whitish area larger than the disc; at the macula is a faint, reddish spot. Eight days later, vision  $\frac{20}{200}$ ; disc as before; the reddish spot still present. Area of infiltration shows a whitish radial striation, is irregularly swollen, and presents evidences of a marked edema of the retina; chorioid surrounding it appears redder than normal; retinal vessels run over the exudate without any very great bending, and in no place are concealed by it.

Here we have to do evidently with a chorioidal exudate, which, however, was associated with an unusual degree of edema of the retina, so that the appearances strongly suggested a retinal detachment.

A third case in which the process seemed almost purely retinal, was the following:

*Case III.*—Fannie L., aged forty-two years, came to the Ophthalmic and Aural Institute complaining of a cloud before the sight which had lasted for two or three months, but during the last two or three days was much more pronounced. Vision, right eye with correction  $\frac{20}{20}$ ; left,  $\frac{20}{200}$ , and in the left there is an incomplete central scotoma. Right eye, interior normal.

Fig. 1.



EXUDATIVE FOCAL CHORIOIDITIS WITH MARKED TRANSDUCATION INTO THE RETINA (PARTLY SCHEMATIC).—A brilliant-white small, sharply circumscribed exudate occupies the region of the macula lutea. Temporally from this is an area of white exudate and edema occupying the most anterior layers of the retina. Vessels adjoining this area tortuous (tortuosity much exaggerated in the drawing) and one entering the mass of exudation is partially buried by the latter. Remaining vessels, optic disc, and the rest of the fundus normal. General mass of edema and exudation cleared up rapidly, the small, brilliant-white exudate more slowly, but all ultimately disappeared, leaving the whole fundus apparently normal.

In the left eye, extending temporally from the disc and beginning at a distance of  $1\frac{1}{2}$  to two disc-diameters from it, is a lobulated white mass about three disc-diameters long, traversed by retinal vessels, which in part are buried in it, one vessel in particular being interrupted a number of times as if the blood current was broken. (Fig. 1.) Mass not especially elevated except

\* Read before the Ophthalmological Section of the New York Academy of Medicine, November 17, 1902.

at nasal end, where there is a portion more superficial, and brilliant white, like an exudate of albuminuric retinitis; the rest of the mass is less white, and fades off at the temporal side into the retina, while above and below it is rather sharply circumscribed. Surrounding retina somewhat hazy, and vessels, especially one skirting the upper border of the mass, tortuous. Disc normal, except that the veins are perhaps somewhat enlarged. No hemorrhages anywhere. Urine contains neither albumin nor sugar; no arteriosclerosis, but tension of the vessels is very high.

Patient received calomel in  $\frac{1}{30}$  grain doses five times a day. The general mass faded pretty rapidly, being almost gone in three or four weeks, but the brilliant patch, which lay just above the macula, resolved more slowly. A few punctate hemorrhages appeared in its vicinity, as it absorbed. In two months, spot had disappeared; and in three months and a half, there was no trace of what had taken place except a few glistening dots in the macula and a faint stripe of opacity near it. Vision in the left eye  $\frac{2}{10}$  months after she was first seen was  $\frac{20}{20}$ ; semi-annular paracentral scotoma down and in from fixation-point.

Here we have a large mass of exudate in the most anterior layers of the retina without disorganization of the nerve elements and, indeed, without any destructive effect upon either chorioid or retina. Whether a case like this can be ascribed wholly to a transudation from the chorioid, or may not also be due to an exudate derived directly from the retinal vessels, seems a matter of considerable doubt. The exudate was distinctly in the retina, and in fact in its most anterior layers. Yet the non-implication of the retinal vessels and the optic nerve in the case of an exudate lying as close to the disc as this, would seem to show that the retina was not actively inflamed, but simply afforded lodgment to a transudate that had penetrated into it from the chorioid. This view of the case is rendered the more likely on account of the rapidity with which the exudate cleared up and the almost complete restoration of function.

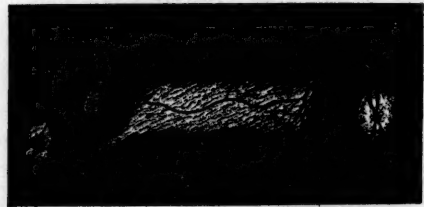
Summarizing the features presented by these cases and others more or less similar, that we meet with, we may say: Cases of the type here considered are distinguished by their acute onset, rapid course, and on the whole favorable prognosis. They occur especially in young people and often without assignable cause. They are marked by the presence of a single circumscribed exudate situated usually not very far from the optic disc; forming a whitish mass, which may be either prominent and pointed or low and flattened, and which is often associated with considerable edema and milkiness of the surrounding retina, but not often with much engorgement of the papillary vessels or much swelling of the nerve.\* The amount of impairment of vision depends on the site of the exudate, varying from  $\frac{20}{70}$  or better to  $\frac{2}{200}$  or  $\frac{3}{200}$ . A more or less absolute scotoma, which may be either positive or

negative, frequently remains even after the vision is otherwise restored to normal. The salicylates, calomel in broken doses, and rest in bed seem to furnish the best treatment.

*Plastic Chorioretinitis.*—A case, which in the beginning must have been closely allied in appearance, at least, to Case III, just described, was

*Case IV.*—M. S. B., a man of sixty-eight years, came to me stating that the sight had been diminishing slowly for nine years in the left eye and for four years in the right. Notices that centre of objects looked at directly is covered by a dark object; vision is distinctly better at night or on dark days. He also states that his urine has been examined repeatedly during the past five years and found normal. Just before his sight failed he had an attack of typhoid fever. His temporal arteries are tortuous, but the arteries in general and the pulse appear quite normal. Patient has been absolutely deaf since the age of two—evidently a case of nerve deafness, the drum membranes being quite normal. Vision in each eye  $\frac{15}{200}$  by eccentric fixation; refraction about emmetropic; large central scotoma in both eyes. Discs in both eyes and vessels apparently normal. No ab-

Fig. 2.



PLASTIC CHORIORETINITIS WITH FORMATION OF A THIN MEMBRANOUS EXUDATE (PARTLY SCHEMATIC).—Temporally from optic disc is a tenuous membrane-like deposit of connective tissue apparently occupying the superficial layers of the retina and traversed by unchanged retinal vessels, which in places lose themselves in its substance. To the outer side of this two fainter but similar deposits, also traversed by retinal vessels. (The vessels, except those that cross the exudates, are not indicated with any precision; moreover, the drawing very inadequately represents the tenuous, membrane-like appearance of the main exudate). Disc and surrounding fundus normal.

normal temporal pallor of the discs. In the right eye (Fig. 2) a whitish, cloud-like patch with no very sharply defined edges begins about one disc-diameter from the temporal margin of the disc and extends about four disc-diameters outward. One of the branches of the superior temporal artery courses along the patch and sends branches across it; one or two other branches from the disc run out upon the patch and terminate in it, being apparently lost in its substance. At the temporal end of the patch are two other smaller and fainter patches, both of which are crossed by retinal vessels; the outer of these has a slight shading of pigment in the middle.

In the left eye similar patches, but more variegated, all in the region of the yellow spot, are found, namely: (1) Near the disc on the temporal side, a faint, ill-defined, yellowish spot, one-eighth the size of the disc, crossed by retinal vessels; (2) one or two very bright, white, clear-cut patches about one-fourth the diameter of the disc and close to the latter; (3) also near the

\* Pigmentation was not present in any of the cases that I saw, nor were deposits observed upon the posterior surface of the cornea. In these regards the cases differed from those described in the excellent paper by Friedenwald (Trans. of Am. Ophth. Soc., 1902, p. 577), which I did not have an opportunity of consulting, as it was not published until after the present article went to the printer. In most points Dr. Friedenwald's observations and mine agree except that he very often finds the focal region situated far from the disc.



disc on the temporal side a fleecy, faint, whitish patch of larger size and ill-defined outline. All these patches are in intimate relation with some retinal vessel; (4) to the temporal side of disc, a large, irregular but generally elevated patch, whitish and not very sharply outlined, more or less traversed by retinal vessels, which in places appear to lose themselves in the substance. Here and there over it are brownish or inky, punctate pigment blotches, which seem by preference to lie beneath the retinal vessels; there is also on it, near its border, a faint reddish spot, which is in immediate relation with a small retinal vessel.

The patches in both eyes are little if any elevated; look quite flat and membrane-like; are apparently in the superficial layers of the retina, and are all in evident relation with small retinal vessels, which in general run across them without a bend. The vessels themselves and adjacent fundus are quite normal; no aggregation of pigment and nothing to indicate migration of pigment epithelium.

The only other abnormality is in the left lower fundus some considerable distance from the disc. Here is a round area about the size of the disc which is of a lighter red than the surrounding fundus, and is separated from it by a fine but distinct line of demarcation, so that the area looks like a hole in the retina; some light brownish, smoky pigment stripes cross it, as does a fine retinal vessel. Chorioidal vessels not seen.

From the character of the patches and their relation to the retinal vessels I took them to be organized fibrinous exudates lying in the most superficial layers of the retina, but not, as in retinitis proliferans, extending into the vitreous. From the absence of temporal pallor in a case of such long standing, I inferred that the ganglion cells in the macula had escaped destruction, and that the retina was, so to speak, covered by the patches and not destroyed by them. Acting upon this hypothesis and believing that the case was not therefore positively incurable, I put the patient upon absorbent treatment, first calomel in small, broken doses, and then the iodides, with the result that in the right eye the central patch slowly diminished in size, fading at the edges. The improvement in vision was but slight, although the scotoma has diminished so that it now just skirts the fixation-point. In the left eye no improvement in subjective and little in the objective conditions has been secured. The case is still under treatment.

This, then, was a case, which, beginning with an exudate, possibly a hemorrhage, in a situation very similar to that occupied by the exudate in the case last described, went on to organization instead of resolution and formed a *thin membrane-like patch* in the most superficial layers of the retina. It was a case then, of what we may denominate a plastic retinitis, but one in which the organized exudate was very tenuous and did not extend either forward into the vitreous nor backward into the depths of the retina or chorioid.

Of solid consistency and greater prominence were the products in

Case V.—Sarah M., aged thirty-eight years, came to the Cornell Dispensary with a history that the sight had been failing for four months. Diagnosis of chorioretinitis of specific origin was made and patient was put upon mixed treatment. When I entered on service

in the Dispensary she had already been under treatment five months.

In the fundus of both eyes are numerous scattered or aggregated oval or circular, pale reddish spots about one-sixth to one-twelfth disc-diameters in size, strewn along the retinal vessels or in places lying between them; toward the periphery of the fundus, spots more confluent so as to form irregular, jagged, whitish, sharp-cut areas.

In the right eye are several large, elevated, pure white masses, several times the size of the disc; one of these, just above the macula, projects nearly one millimeter above the surrounding fundus. Retinal vessels run over the masses and in places bury themselves in them. The masses are not bordered by pigment, although there is some pigmentation in the rest of the fundus. Down and in from the optic disc and distant one disc-diameter from it, is a pale, grayish-white, hazy mass, one-half disc-diameter in width, which extends into the vitreous. Overlying the optic disc and the papillary vessels is a diagonally placed white bar of connective tissue.

In the left eye the disc is rather atrophic; a white, sickle-like bar of connective tissue jutting out nearly a millimeter in front of the disc, runs concentric with its nasal edge and covers the vessels. No hemorrhages in either eye.

Quite recently (a year after my first observation of the case) new exudates have appeared, especially in the left eye, and increased proliferation has taken place in some of the organized exudates, which now extend further into the vitreous, forming projecting, partly fleecy masses (retinitis proliferans).

Here we have a diffuse chorioretinitis associated with organization of some of the exudates so as to form prominent patches or *projecting outgrowths of connective tissue*; in other words, it is a condition in which with the ordinary changes of a disseminated inflammation of the chorioid and retina, there was combined a plastic retinitis, which differed from that of Case IV in that the products of organization were denser and deeper.

In other similar cases the chorioiditic element may fall into the background, and the plastic process form the prominent feature of the case, as for instance in

Case VI.—Alice H., aged ten years, came to me to be examined for glasses. She had maculae of the cornea in both eyes and pretty marked irregular astigmatism. In the left eye, below and to the outer side of the macula was a large, brilliant, sharply outlined, white mass, irregular in shape but generally quadrangular, bordered here and there by heavy black pigment and traversed by retinal vessels, which in the main are unchanged, although some of the lesser branches look as though cut off or obliterated. Still further below this is a series of pigmented patches extending well toward the periphery, some lying within white patches, others within small decolorized areas of the chorioid. The chorioid surrounding the large white patch is more or less atrophic. The patch itself is elevated everywhere about a millimeter and a half above the surrounding fundus, although it presents in places (especially above) irregular vividly white prominences. It also sends out one or two spurs into the surrounding fundus. Corresponding to this patch was a large, absolute scotoma occupying most of the upper and inner quadrant of the field of vision.

During the nine years that have elapsed since the patient was first seen, the patch has changed somewhat

in shape and has become more densely pigmented. The disseminated spots of pigment in the outlying fundus have also become darker and have assumed a spider-

Fig. 3.



**PLASTIC CHORIORETINITIS.**—Down and in from the macula is a large plateau-like white mass of connective tissue irregularly elevated, but in general about 1.5 mm. above the surrounding fundus. Heavy black pigment borders and overlies the patch, which sends spurs out into the surrounding fundus. Below patch and extending to periphery of fundus is a series of black spider-like pigment spots with atrophy of surrounding chorioid.

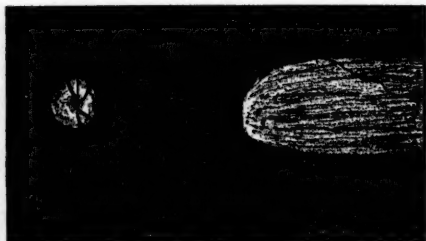
like form like the spots of a retinitis pigmentosa. (Fig. 3.) A year or so after she first came under observation the right eye developed a slight disseminated chorioiditis near the disc which remained, and which six years later showed a slight exacerbation that prevented her from using her eyes for several months. She also had one or two attacks of episcleritis and recurrent corneal irritation in this eye.

In this case the plastic process produced a large plateau-like elevation of connective tissue associated with a slight degree of chorioiditis.

Somewhat similar were the findings in

**Case VII.**—Isaac L., aged twenty-four years. Left eye practically normal. Right eye, posterior cortical catar-

Fig. 4.



**PLASTIC CHORIORETINITIS. (PARTLY SCHEMATIC).**—Large mound-like mass of connective tissue, elevated 1 mm. above the surrounding fundus, and girdling the nasal retina to and beyond its anterior visible limits. There are a few spots of chorioidal atrophy in nasal fundus, which are not shown in the drawing.

act with some peripheral striate opacity. Disc normal. In the nasal fundus a group of minute spots of chorioidal atrophy and pigmentation. Beginning three or four disc-diameters to the nasal side of disc is a white, sharply defined, oblong mass, one to 1½ disc-diameters in breadth and extending horizontally to the left so as to girdle the nasal fundus throughout its whole extent as far as its anterior visible limits. The mass is elevated about one millimeter above the rest of the fundus, is crossed by retinal vessels, and is bordered on one side by a very narrow rim of black pigment, on the other side by an ashen gray irregular lining. One or two punctate hemorrhages lie on the mass at its posterior end. See Fig. 4.

The two cases just described in which large masses project some distance into the vitreous, form a transition between the cases of plastic chorioretinitis with thin membrane-like products as in Case IV or cases with large nodular outgrowths which are still mainly buried in the substance of the retina as in Case V, and cases of true *retinitis proliferans* in which masses of varying size jut far out into the vitreous. It will be noted that a slight degree of retinitis proliferans was shown in Case V, where connective-tissue-like processes projected out in front of the optic disc in both eyes.

The same plastic process, but carried to an extreme degree, was present in the following:

**Case VIII.**—Fannie L., aged eleven years; no history of injury at time of birth or since; convulsions

Fig. 5.



**PLASTIC CHORIORETINITIS (TYPE OF RETINITIS PROLIFERANS).**—Connective-tissue masses, lying directly behind the lens, as seen by direct illumination of the pupil. The masses form a horizontal membranous arch with convexity directed backward. The arms of the arch extend forward and are lost behind the lens. From the under part of the arch a fan-like process extends downward and forward, being apparently inserted in the ciliary region beneath and on the inner side of the lens. From the upper part of the arch a dense membranous strand stretches backward and merges in a large membranous mass which covers the whole retina at the posterior pole of the eye, and is attached to the retina at various points.

at the age of five; has had diphtheria and measles; otherwise no history bearing on the case.

Right eye: V= perception of light; projection rather uncertain. Behind the lens is a large, white membranous arch (Fig. 5) with convexity directed backward; one arm of the arch runs horizontally forward and outward, being inserted beyond the temporal border of the lens; the other arm extends downward, for-



ward and somewhat inward, and expands into a fan-like process which is inserted beneath and to the inner side of the lens. From the concavity of the arch another process extends downward and forward forming a fan-like insertion beneath the lens. From the convexity of the arch a band extends backward and upward, and is attached in the extreme upper part of the retina. An expansion of this band covers the site of the optic disc and macula completely, so that the latter, if present, are quite invisible. The mass in general is very dense and thick, but its outlying portions appear

Fig. 6.



in places spread over the retina in the form of flat, thin, translucent fringes of membrane, or thin, flat reticulate bands (Fig. 6). The retinal vessels cross these, and in places climb up on the surface of the general mass; in other places are buried by the latter.

In the upper fundus are small atrophic patches; among these, on the temporal side, is a twisted, membranous connective-tissue strand close to the retina. In the nasal fundus some of the atrophic patches are larger and disclose the chorioidal vessels. From one of these larger patches a small, white, flocculent mass projects into the vitreous. No pigment patches anywhere and no hemorrhages.

Left eye, perfectly normal.

This case is not unlike that described by Wintersteiner (*Arch. f. Augenheilk.*, XXVIII, and *Archives of Ophth.*, 1895, p. 197). Wintersteiner questioned the inflammatory character of the condition he depicted, although the arguments he presented are not very convincing. Moreover, the counter hypothesis that he offers (persistence of embryonic folds in the retina) seems scarcely adequate.

In my own case the existence of an inflammatory element was shown by the presence of the patches of chorioiditic atrophy, from which some of the connective-tissue processes emanated. And to my mind the conditions present here as well as in Wintersteiner's case and in other analogous cases that I have seen, are clearly due to organization taking place in exudations which are themselves very probably the result of hemorrhage. In other words, these are simply cases of retinitis proliferans in which the processes of exudation and organization have been carried to an excessive pitch.

Still another form which this plastic process may assume is that of a *retinitis striata*. This consists of whitish stripes lying in the retina; often branched and running in general from the periphery toward the disc. Such stripes may arise from different causes, but in many instances surely are due to organization taking place in hemorrhages (Holden, *Arch. of Ophth.*, 1895, p. 147).

The examples above cited comprise only a few

of the various appearances that may be presented by such organized exudates.

*Summarizing the rather divergent cases that may yet be properly grouped under this type*, we may say: Plastic chorioretinitis is an affection marked by pretty sharply defined, whitish aggregations of connective tissue, which may lie sunk in the substance of the chorioid or retina, or may stretch along the surface of the retina, or may project out into the vitreous. When projecting out into the vitreous they may extend as far forward as the lens or ciliary body. Such aggregations may appear under the form of flat, more or less tenuous, membranous patches; of branching striæ; of dense and thick nodular-looking masses; of large plateau-like elevations; of dense fibrous strands; or of fleecy outgrowths. These connective-tissue products are attributable to organization taking place in fibrinous exudates. The exudates themselves may develop in conjunction with a disseminated chorioiditis, which, however, is at times quite inconspicuous; or they may accompany a retinitis, in which case they very frequently originate in a patch of hemorrhage; or they may also probably occur as the result of hemorrhage without inflammation of either retina or chorioid. The underlying cause for all these changes (chorioiditis, retinitis, hemorrhages, exudates, and connective-tissue products) may be traumatism or may be syphilis, while in other cases still no cause can be made out. (In this statement I follow Weeks' etiological classification of retinitis proliferans, which I regard as simply one of the varieties of the condition under discussion.)

Once developed, the plastic products are apt to remain unchanged for years, although the slighter formations seem to be even then still capable of absorption. (See Case III.) On the other hand, especially when there are recurrent hemorrhages, the connective-tissue growths may be added to from time to time, thus causing progressive deterioration of the eye. Plastic chorioretinitis is often accompanied by a very great reduction of sight, which, however, may be due not so much to the connective-tissue outgrowths as to the associated lesions. Mercury and the iodides seem to constitute the best treatment.

*Type of Retinitis Circinata.*—Retinitis circinata, as described by Fuchs, is an eminently chronic affection, associated with pronounced impairment of central vision; occurring particularly in women and always after middle life; marked by a rather extensive grayish or yellowish discoloration in the macula which is surrounded by an interrupted ellipse composed of white spots, either discrete, or else coalescing, to form white, lobulated, sharply circumscribed, flat masses. The remaining fundus, the retinal vessels, and the nerve show little change.

I saw a typical instance of this affection in the right eye of

*Case IX.*—Rose H., aged seventy-five years, a patient in Dr. D'Oench's service at the Ophthalmic and Aural Institute. In right eye, macular discoloration, and el-

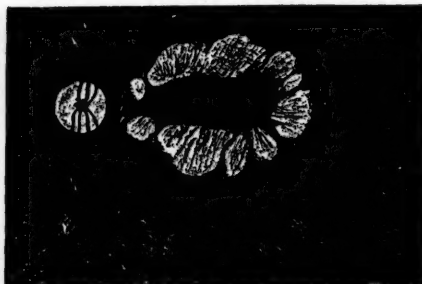
liptically arranged, lobulated, sharply circumscribed, white masses surrounding the macula and lying directly beneath the retinal vessels. No pigment deposits. Borders of masses in places shining, as though from colloid transformation. Rest of fundus and vessels appear normal.

The left eye had a blackish-gray, smoky pigment mass stretching across the macula; otherwise showed little that was abnormal. Vision was very greatly reduced.

We sometimes meet with cases not quite so typical. Fuchs himself admits that in diabetes and albuminuria similar lobulated masses are encountered, but without the typical arrangement. I have, however, seen a case of combined diabetes and albuminuria in which precisely the picture of a *retinitis circinata* but without the macular discoloration was present.

*Case X.*—D. M. J., a man of fifty years; impaired sight for fifteen months; diabetes and albuminuria. Vision, right,  $\frac{20}{300}$ ; left,  $\frac{20}{100}$ ; no central scotoma; in both eyes, discs somewhat blurred but no marked neuritis; vessels small. Surrounding the macula are several large, flat, brilliant, white, striate patches with lobulated borders, resembling cumulus clouds. These patches encroach pretty closely upon the macula and form a figure of elliptical shape surrounding it (Fig. 7). In the right eye the large patches are continued

Fig. 7.



**RETINITIS CIRCINATA.**—A case of albuminuria and diabetes, in which the exudates assumed the typical circinate form, but in which the decoloration of the macula was absent. Little involvement of the disc, and the only changes present in the rest of the fundus are a few small, brilliant, white splashes of exudate underlying the retinal vessels. (In this sketch no attempt was made to indicate the retinal vessels with accuracy nor the precise outline of the exudate, although the latter is shown with substantial exactness. The exudate was more brilliantly white than depicted.)

to the disc by a series of small, bright spots of exudate about one-sixth the size of the disc and yellower in hue than the large patches. Similar spots are scattered here and there on the fundus, particularly in the right eye; these all lie underneath the retinal vessels. A few punctate hemorrhages occur, particularly in the right eye, and are most apparent in the periphery of the fundus; one small, dark hemorrhage lies on one of the large patches. The retina shows comparatively little edema and except for the spots looks quite normal.

Fuchs is inclined to attribute the appearances observed in *retinitis circinata* to the presence of a fibrinous exudate poured out into the retina. Yet some cases which at least simulate a true

*retinitis circinata*, if not actually belonging in the same category, are evidently due to organization of hemorrhages. This was seen in

*Case XI.*—Miss J. M. H., aged about fifty-five years, came to me in February, 1897. Diabetes for six years; impaired sight for two months. In right eye, V, with correction  $\frac{20}{100}$ ; in left,  $\frac{20}{100}$ ; relative central scotoma, both eyes. In the right eye diffuse punctate and striate hemorrhages; edema of macula; punctate bright, white patches and punctate hemorrhages. Temporal side of disc pale.

In left eye small, bright, white spots near macula; patches underlying retinal vessels.

Hemorrhages recurred from time to time, and about a year after the first observation it was noted that the hemorrhages were replaced by shining white patches of a somewhat circinate arrangement. This appearance had vanished one year later. Vision in the right eye diminished rapidly, being only  $\frac{20}{100}$  in May, 1899, and in May, 1900, = perception of movement of hands. It may be added that in November, 1898, patient had had an attack of acute nephritis.

In May, 1900, in the right eye, there are floating opacities and, near the site of the optic disc, organized white masses projecting from the retina, at least two millimeters into the vitreous. The lower part of the fundus is dark (evidently occupied by fluid blood). In December, 1900, the conditions in the patient's right eye were the same.

A few months later the patient died in an attack of convulsions.

Here we have a case in which recurring hemorrhages into the retina, due to diabetes and probably also to a complicating nephritis, produced at one time an appearance more or less resembling that of a *retinitis circinata*, at another time a true *retinitis proliferans*. The case, therefore, forms a sort of connecting link between those of Group II (type of plastic retinitis) and a true *retinitis circinata*; and it must be added that some authorities regard *retinitis circinata* anyhow as only a variety of *retinitis proliferans*.

#### THE INDICATIONS FOR OPERATIVE INTERFERENCE IN INTRACRANIAL TENSION.\*

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THE recent advances in clinical medicine and clinical microscopy have opened up a new field for operative interference. Cases of coma with no external injury of the skull have heretofore been treated by the expectant plan with almost uniformly fatal results. Surgery owes much to these two departments of medicine for valuable knowledge upon a subject which is comparatively new, and which offers an additional field for operative work. Intracranial tension is a condition which a study of modern pathology has shown, calls for surgical interference. The exact line of demarcation between those cases in which conservatism is to be employed, and those in which bold operative interference is to be undertaken,

\*Read before Alumni Society of Bellevue Hospital, Dec. 3, 1902.

is, however, not so clearly defined. It is with a view to establish some principle to guide the surgeon in treatment, that this subject is brought to the attention of the Society. During the past few months the writer has had under treatment many cases in which the indications for and against operation have been pretty clearly defined. A brief reference to and the presentation of some of these cases this evening would better illustrate the subject than any amount of theoretical discussion. Before taking up the special cases it seems pertinent to consider briefly the modern pathology of intracranial lesions. The most important preliminary step is to differentiate clearly between cerebral compression and cerebral pressure. The old classification of concussion and compression of the brain no longer attracts the attention of the surgeon. The phenomena connected with concussion are often transitory, usually not serious, and involve as a whole no important lesion of the brain. Concussion has to do with a disturbance of the fluid equilibrium, and is usually of momentary duration. If the concussion is severe, spasm of the vasomotor system occurs, and the condition simulates surgical shock.

Fränkel maintains that without consciousness no concussion can occur, a fact which is of great importance in medico-legal cases. For example, if a person while descending a ladder has an attack of syncope, and becomes unconscious, and then falls in consequence of his unconsciousness, he will not suffer from concussion of the brain. If he falls while conscious he is certain to receive a concussion of the brain if he does not sustain a more serious lesion. In the former case he may suffer from cerebral compression, or cerebral pressure according to the violence and extent of the injury. In the latter case he may escape both of these conditions, and suffer from simple concussion, or he may escape any concussion and suffer from a more serious injury such as cerebral compression or cerebral pressure. Concussion is a condition found in fractures of the skull as well as in trauma without fracture. The manifestations present vary greatly with the individual. The writer has made an observation from the study of innumerable cases of concussion, that as far as he knows is original. The observation is that the more highly the nervous system is developed, the more sensitive the patient is, the more highly the intellectual faculties are cultivated, the greater the degree of concussion following head injuries. The writer saw last month an untutored lad who fell six stories, through an elevator shaft and sustained a compound fracture of the skull, and who immediately arose and climbed up the six stories from which he had just fallen. On the other hand concussion may follow the slightest fall upon the head in a highly educated person. This patient who fell six stories without any shock is here to-night for examination and from his physiognomy and general appearance it is evident to all that he is of

a very low grade of intellectual development. He can neither read or write, and with difficulty can pick out the letters of the alphabet, although nearly sixteen years of age. In conjunction with this subject the writer desires to add that children may fall from great heights, and if not killed outright, may rapidly recover. This too, depends upon the nervous organization of the child. For example, the writer saw at one time two children who fell from the third story of a tenement house to the street below. In one case the child's fall was broken by catching a clothes-line which broke the force of the fall. This child recovered rapidly. In the other case the child also fell to the pavement from the third floor and struck upon the head and produced an indented fracture upon the side of the parietal bone. The indentation was very marked and the depressed bone caused cerebral compression to such an extent as to produce hemiplegia of the opposite side of the body. The writer had the child taken to the operating room, and while in deep coma and hemiplegic, the sides of the head were manipulated so as to cause a bulging out of the elastic bones of the skull, causing the indentation to disappear immediately, and consciousness returned at once, and the hemiplegia relieved instantly. This case, which was seen by the writer with Dr. Archer, is unique in surgery, and illustrates to what degree a child may be injured and at once be relieved without any unfavorable symptoms.

The subject of contusion and laceration of the brain, does not concern us in this discussion beyond the fact that they are the causes of intracranial tension. Following concussion about which brief mention is made, contusion is a condition that requires a passing comment. Contusion is present in almost every head injury, in a greater or less degree. Phelps describes the anatomical conditions as follows, "A distention of the parenchymatous vessels, a general formation of minute thrombi, the presence of punctate extravasations, and a more or less distinct edema. The minute thrombi are the most characteristic of the several morbid conditions which have been enumerated. The edema, which is variable in amount, sometimes appreciable only after some delay and a close inspection upon section, and at other times so profuse that the fluid can be squeezed from the brain by the hand as from a sponge, is notably frequent. All these abnormal conditions, the extravasations, thrombi, and edema are simply measures of the general hyperemia which immediately preceded death." Laceration is a condition that has an important etiological relation to intracranial tension. The term itself expresses the nature of the trauma. The hemorrhages are generally so profuse as to completely disorganize the brain tissue. Laceration of the brain can cause death. Contusion on the other hand, is not of sufficient violence as a rule to cause death primarily; but in a fatal case of contusion, death is due to secondary inflammatory changes which have to do with intracranial tension, among



which edema is a most important etiological factor in causing death.

By cerebral compression is meant the application of any force acting from without upon the brain in part or in whole. These forces may appear in the form of blood, bone, pus, or foreign body. These forces act as external agents to compress the brain and cause phenomena comparable to the group of symptoms designated by the stereotyped term of compression.

By cerebral compression on the other hand is meant the application of any force acting from within upon the brain. This force causes the brain to impinge against the bony walls of the cranial cavity. This condition of cerebral pressure is seen in the traumatic hydrocephalus, in diffuse meningitis, or in surface blood effusion in the subdural space and in cerebral edema. In cerebral pressure the intracranial tension is equally felt in the cranial cavity, as well also as in the general nervous system.

The next case that is brought here to be shown, is the one of cerebral pressure due to internal hydrocephalus. This child is blind, deaf and dumb. Lumbar puncture has been performed several times; but with no evidences of relief from the intracranial tension. It may be that this is explained because either too few lumbar punctures have been made, or that the foramen is closed and the withdrawal of the cerebrospinal fluid does not come from the ventricles. This case the writer believes is one for trephining, in order to relieve the intracranial tension which causes such distressing pain from which the child suffers. The evidences of pain are constant crying and screaming until under the influence of an hypnotic, the striking of the head violently with both fists, and the knocking of the skull against the side of the bed. Trephining will not cure this patient; but it will relieve the agonizing pain from which the child suffers. If two openings are made, the dura ought to puff through the trephine holes, and this may relieve enough tension to diminish the sufferings of the child, and if this does not succeed, aspiration of the ventricles may be performed through these openings, and the cerebrospinal fluid drawn off in quantities sufficient to relieve the tension. Increased blood pressure both in cerebral compression and cerebral pressure, nourishes the respiratory centers, and Cushing has shown that as long as the vasomotor system maintains the blood pressure higher than the intracranial tension, so as to keep the respiratory center nourished, respiration will continue. If now the vasomotor system fails, this same blood-pressure falls below the intracranial tension, which results in loss of nutrition to the respiratory center, and the patient succumbs with a low blood-pressure and rapid heart's action. If now artificial respiration is carried on, the patient may live for hours and then die. Perhaps the best way to clearly define the difference between cerebral compression and cerebral pressure, both of which are associated with intracranial

tension, is to briefly report and exhibit cases of each, and emphasize the clinical differences, and note the symptoms which call for operative interference in each case. Recently the writer has had several cases under treatment, some illustrating cerebral compression and others cerebral pressure.

The patient that is next to be shown, is one that illustrates the phenomena connected with cerebral compression. This patient, who was admitted to Bellevue Hospital, was first seen by my colleague, Dr. Gwyer. The patient sustained a compound fracture of the skull, with several wounds in the lateral sinus. The hemorrhage was alarming and controlled by packing with sterile gauze through the opening upon the fractured skull. The compression made by the gauze produced a paraplegia. The loss of motion was complete, and Babinski's sign of hyperextension of the great toe was well marked. The loss of sensation was not as complete as the loss of motion. During the following week the gauze was removed by the writer, little by little each day, and upon the entire removal of the gauze, which relieved the compression of the brain, the paralysis disappeared. The explanation of the paraplegia was compression over the motor centers of the lower extremity. The packing made compression upon the upper third of the anterior and posterior central convolutions, but ended so abruptly upon each side of the median line, that neither the upper extremities, nor the face became affected. To Dr. Camac and his assistant, Dr. Hastings, of the department of clinical microscopy in Cornell University Medical College, the writer is indebted for some interesting, and in many respects unique observations in regard to blood pressure and blood count in these cases of cerebral compression and cerebral pressure. The arterial pressure in this case of cerebral compression was 162 mm. of Hg in right radial and 155 mm. Hg in the left radial. Some packing was removed on the following day, and the right radial showed 150 mm. of Hg in the right radial, and 145 mm. of Hg in the left radial. These observations were taken while the writer was dressing the case upon the operating table and removing the gauze which caused the pressure. When the gauze was removed, the movements in the legs were increased to such an extent that he could flex the entire limbs upon the pelvis.

Pressure was made by the flat surface of a scalpel over the motor areas in the opening of the skull, and it caused a change at once in the arterial pressure as was recorded by the Oliver hemodynamometer. After the removal of the gauze pack, the patient's mental condition became normal. The writer attributes the fact that the arterial pressure did not entirely drop to normal to a slight edema over the site of the injury, which in a few days disappeared. In marked contrast to the case illustrating cerebral compression, which the writer saw in consultation with Dr. O'Connell, a case illustrating

cerebral pressure. This child fell three stories, and struck upon her head. Apparently there was no fracture, and no external wound of the scalp; but the child was in the deepest coma from which it could not be aroused. The child had relatively a slow pulse of increased arterial pressure, a Cheyne-Stokes respiration, and slight convulsive movements of the body. The vasomotor paralysis did not entirely fail in this child's medulla, but it would have without a doubt in a short time, had not relief been afforded by surgical intervention. The deep coma with increased arterial pressure suggested surgical interference. The uninjured scalp was incised by the writer, a linear fracture was found, the edges of which had separated, and through the cleft blood and cerebral substance flowed.

This child remained unconscious for over a week. The temperature fell at once to nearly normal, and remained so for several days, when it rose gradually to 104° F. and then fell during convalescence. Her pulse also came down from 130, its highest point, to normal. The respirations from 40, at the time of the accident, to normal. The facial nerve was slightly inactive, the pupils were dilated, and reacted sluggishly to light. Blindness was present for several weeks during the period of encephalitis. The lower and upper extremities were weak, but with no evidence of rigidity. The knee-jerks were present on both sides as well as the abdominal reflexes. The tactile sensation was not much disturbed after the child became conscious. During the week of unconsciousness the child was fed by rectal enemata.

After many weeks the child was allowed to walk and its gait swayed, and the feet shuffled. Some months subsequent to the injury, the patient was examined by Dr. Fränkel, who reports the mental condition bright, no impairment in memory, the skull nowhere tender on percussion, no abnormalities of gait, no evidence of motor disturbance, or incoordination, no disturbances of the plantar or patellar reflexes, in fact the child was apparently normal. In other words, the child from a condition of deep coma lasting one week, cerebral irritation, prolonged encephalitis, absolute blindness for several weeks, disturbances of motion and other nervous phenomena, recovered in consequence of bold operative interference, for the relief of intracranial tension to such an extent, that a thorough neurological examination could detect hardly any deviation from the normal standard. Operation for the relief of intracranial pressure with no external injury of the scalp, was performed in this case, and at once relieved the dangerous symptoms and the operation effected a permanent cure, in a case that seemed for weeks, absolutely fatal. This little patient, as is evident to all here, is perfectly well, and the writer desires to acknowledge his thanks to Dr. O'Connell for his kindness in bringing this child to the meeting this evening.

In marked contrast to this case is another, recently observed by the writer, in which intracranial tension was present; but not to a degree sufficient to cause profound coma. The case illustrates the presence of intracranial tension, in which operation was not indicated, although for many days that fact was not certain. A study of this case offers a fitting opportunity to differentiate between those cases of intracranial tension, in which operation is not indicated, and those in which it is indicated.

The case which will now be presented is one that illustrates cerebral pressure, like the one just recorded, but unlike it in the important clinical fact that operation for intracranial tension was not indicated. By bringing these two cases together, both of which are associated with intracranial tension, the one calling for operative interference, and the other not, a clear clinical picture is presented which is most suggestive. In this case, illustrating cerebral pressure, the clinical history is unique from many points of view. The patients were suffering from intracranial tension, one from cerebral compression, and the other from cerebral pressure, and the opportunity to compare the two conditions both during and after the accident, was a most extraordinary incident. This case which is to illustrate cerebral pressure, was admitted to the hospital suffering from hematemesis. The writer examined the patient shortly after his admittance, and was struck by the absence of all symptoms indicative of a serious stomach lesion. The patient was not in collapse, had a fairly good pulse, and his general condition led the writer to believe that some other injury had occurred, other than rupture of the stomach, or the tearing of some large vessel in the viscus. The writer examined the ear and found deafness upon the right side. The patient complained also of a certain fulness in the head, especially marked at the base of the skull but who was perfectly conscious and free from any shock. He stated that he had never experienced any impairment in hearing and that the loss of audition was the result of his accident. Upon further inquiry the patient said he felt a sense of fulness in his head, and that he was dizzy if he raised his head, or moved it suddenly. The writer, with this data, made the diagnosis of fracture of the posterior or middle fossa of the base of the skull, accompanied by a mild degree of intracranial tension. Upon the third day a well-marked ecchymosis appeared behind the mastoid process which made the diagnosis positive. The patient's condition from the time of the accident grew gradually worse, and a still more thorough examination was instituted. The hematemesis was explained by the blood escaping through the fractured fissure in the posterior fossa, and along a fissure which extends into the middle fossa and into the middle ear and down the Eustachian tube into the stomach. There was no blood and no cerebrospinal fluid coming from the external auditory meatus. This



was explained by the absence of any injury to the membrana tympani. The eyes were next examined by Dr. Duane, who reports two days following the injury, that the disc was somewhat swollen and the outline slightly indistinct and somewhat hyperemic with no tortuosity of the veins, and no pulsation of the arteries, and with no distinct optic neuritis. The ocular excursions were normal, showing no paralysis of the muscles of the eyes. Two days later the discs were swollen and the veins engorged and tortuous in both eyes. Optic neuritis was now present in both eyes opposite to the fracture in the base and which was explained by the decussation of the fibers. The examination of the blood two days following the accident by Dr. Hastings showed red blood cells 6,488,000, white blood cells, 15,000, polynuclear cells, 72.8 per cent., lymphocytes, 19.2, large mononuclear 6.4, eosinophiles 0.8, hemoglobin, 90 per cent.

Two days later, red blood cells 5,900,000, white blood cells 16,000, polynuclear cells 72 per cent., lymphocytes, 17.6 per cent., large mononuclear 10 per cent., eosinophiles 0, hemoglobin 90 to 100 per cent. Two days later, red blood cells 5,916,000, white blood cells 12,400, polynuclear cells 66 per cent., lymphocytes 22 per cent., large mononuclear 10.8 per cent., eosinophiles 0.8, hemoglobin 90 per cent. One week later, red blood cells 5,024,000, white blood cells 10,000, polynuclear cells 70.5 per cent., lymphocyte cells 19 per cent., large mononuclear cells 9.5 per cent., eosinophiles 1, hemoglobin 90 per cent.

The examination of the blood-pressure two days after the accident by Dr. Hastings showed with the use of Oliver's hemodynamometer that in the right radial it was 115 (mm. Hg), while in the left radial it was 135 (mm. Hg). Two controls were taken in order to verify the above examination. Two days later the right radial was 130 (mm. Hg) and the left radial 125 (mm. Hg) controls were also taken to verify these observations.

Two days later the right radial was 127.5 (mm. Hg) and the left radial 130 (mm. Hg). One week later the blood pressure was in the right radial 125 (mm. Hg) and in the left radial 127.5 (mm. Hg). From now on the blood-pressure fell. The urinary analysis two days after the accident was unimportant. Color, amber; reaction, alkaline; sp. gr., 1.020; albumin, negative; sugar, negative; microscopical, negative; urea, eight grains to the ounce. Two days there was but little change except the urea showed 10½ grains to the ounce.

It was thus evident that after the fourth day a general improvement occurred in the optic neuritis, in the slight fall of the blood-pressure, in the limitation of the number of the red cells, in the leucocytosis and in the change of the blood cells and in the urinary analysis. The neurological examination made by Dr. Fränkel on Nov. 1, 1902, showed a very marked dulness on the right side of the head on percussion, also very

marked tenderness on the right side over the mastoid process. Pain was not elicited on deep pressure but on light percussion. This region so tender to percussion showed no external hyperesthesia. The sense of smell was apparently undisturbed. Both upper lids were somewhat lowered, and the pupils circular in outline, were equal in width. The pupils responded promptly to light. The ocular excursions were free and the lateral movements were slight, and nystagmus to a certain degree was present. There was no defect in either the motor or sensory portion of the fifth nerve. When the face is in absolute repose the right angle of the mouth droops, and when painful stimulation (pin) is applied to the skin of the right side of the face, reaction is marked. Active stimulation of the facial nerve shows a slight deficiency in all the branches upon the left side, but is most marked lower down. There was impaired bone conduction on the right side, while mechanical irritation upon the left of the face showed a vermiform reaction. The soft palate moves freely and is drawn up on the left side and the sense of taste was present upon the anterior one third of the tongue. There was no evidence of any disturbance of the eleventh cranial nerve, the tongue was freely movable and there was no evidence of paresis. Active excursions of both extremities were equally present. On exhibition of motional reflexes, the left side of the face was inactive. There was no disturbance of coordination in the upper extremity. Abdominal reflexes were present, the left was more active than the right. Plantar reflexes were diminished, spasticity in the lower extremities was not present, and the knee- and ankle-joints were normal. The amount of intracranial pressure varies of course with the character of the injury. The tension is often very great as was illustrated in a case in which the writer trephined the skull where there was no injury of the scalp, and where there was fracture of the bone.

The operation was performed on account of traumatic hemorrhage in the brain. The intracranial tension was so great that the clot, which was about the size of an English walnut, escaped from the lateral ventricle through the track made in the cortex and through the slit in the dura mater, and through the trephine hole, and shot into the air some feet above the operating table. The force with which this clot was fired into the air, shows how great the intracranial tension is in these cases of hemorrhage. The selection of the site upon the skull, over which the trephine was placed, was determined by a monobrachial paralysis, which was present, and appeared very shortly after the head trauma. As the localizing symptoms were unmistakable as to the situation of the hemorrhage, the writer trephined over the center for the arm, and removed the clot from the lateral ventricle. This is the first and only case as far as the writer can find, in which a cerebral clot in the ventricle has been removed in which no injury of the scalp or bone was present.



This case is unique in many respects. It illustrates the accuracy of cerebral localization, the projectile force of intracranial tension in hemorrhage, the value of operative interference in cases heretofore relegated to the treatment of expectancy.

Intracranial hemorrhage is one of the most frequent causes of intracranial pressure. It may also be caused by bone, pus, and foreign body. In order to clearly understand the theory of intracranial pressure, it is necessary to bear in mind two facts; first, that the brain itself is incompressible, and second that the cranial cavity itself is incapable of expansion, therefore, the pressure of a clot of blood or a fragment of bone, or a collection of pus, or any foreign body must be accommodated in the limited space in which the brain is lodged. If the foreign body is of sufficient size to fill the intracranial space by one twelfth, death results. Leyden has stated that intracranial pressure must equal the blood pressure to produce death. Now, while the skull cavity is a space incapable of expansion, and the brain is incapable of compressibility, these foreign bodies just referred to must find room at the expense of the fluids contained in the arterial, venous, capillary and lymphatic channels. In other words, the foreign body must cause a collapse or obliteration of the vessels, because the cerebral tension equals that of the vessels which supply nutriment to the brain. This obliteration of the vessels causes stasis. This stasis now causes an increase of blood-pressure in the parts adjacent to the obliterated vessels. The increased tension is felt in the veins and the capillaries of the adjacent area, and causes higher blood-pressure which produces a transudation for the reason that the plasma passes more readily into the brain tissue than the blood does through the obliterated veins and capillaries and cerebral anemia is established. Cannon has shown in his valuable experiments that anemia of the affected area alone is not the only factor in the production of intracranial pressure, but that the intracranial pressure, the result of traumatism furnished another factor, viz., increased osmotic pressure in the brain itself, causing it to take up water from the transuded plasma as explained by Hill. In other words that a force was operating in the brain substance that was greater than blood pressure and explained the cerebral pressure symptoms.

Cannon has shown that following head injuries there will be found near the lesion, venous stasis, while distant from the lesion acute anemia so that a limited area is present in which blood supply is cut off and, in consequence of the loss of nutrition by blood, oxygen is absent. Loeb has shown that the gastrocnemius of a frog's leg, which was deprived of oxygen by cutting off the blood-supply for one week, showed an increase in weight of from 25 to 40 per cent. In other words, Loeb demonstrated that the deprivation of oxygen showed that "the active agent in the production of swelling is osmotic pressure."

If now, as Cannon has pointed out, in cerebral trauma there is stasis and acute anemia and loss of oxygen, in any given area these conditions produce an increase in osmotic pressure and swelling from edema follows, which causes the intracranial pressure. Loeb placed a brain in a two-per-cent. solution of sodium chloride and found that it increased in weight, and so a brain by osmotic action of the serum around a given lesion causes it to swell and thus intracranial tension is produced. This same process spreads and soon edema is sufficient to cause death since the brain is incompressible, and the skull inelastic, and it is only a question of the degree of intracranial tension to produce a fatal termination.

The writer has studied clinically these cases of intracranial tension along the lines suggested by Cannon and Cushing, to both of whom the writer acknowledges his indebtedness for the valuable deductions drawn from their experimental work upon lower animals, and which experiments have been guides to the writer in his study of the clinical phenomena connected with intracranial pressure occurring in men.

To be sure, cases of intracranial tension have occurred in which unconsciousness, vomiting, hemiplegia, loss of rectal and vesical control have been present, and the patients recovered. On the other hand cases of intracranial tension have occurred in which the autopsy showed that there was no epidural, pial or cortical hemorrhage, and only a few areas of softening. In other words the slightest laceration may cause death. Bullard believes that in such cases edema which is secondary to the lesion is the cause of death. He explains the fatal issue by the fact that the brain acts like a sponge and impinges so hard against the bony walls forming the skull as to arrest the pulsation of the dura mater. Trephining of the skull and incision of the tense dura relieves immediately the intracranial tension, and this operation saves the life of the patient. In these early operations the tension is relieved and fatal edema does not follow. In all of these cases death will not occur until intracranial pressure equals arterial pressure. When this takes place the vessels in the brain undergo stasis which in turn deprives the medulla of blood and death ensues.

The treatment of intracranial tension is a new subject and one to which the writer has given of late special study. He is convinced that operative treatment is indicated in many of these cases and has employed this measure with most gratifying success. The indications for operative interference are in some cases perfectly clear while in others the phenomena present would not justify so severe a measure. The greatest difficulty the writer has found is to determine what the line of demarcation is between the cases that demand trephining or lumbar puncture and those in which the plan of expectancy can be adopted. The writer is convinced from an extensive experience in head injuries that deep coma calls for operation at once. He is in doubt in the absence of deep coma as to the expediency of operative inter-

ference in less severe cases of intracranial tension. Reference is now made to those cases of intracranial tension in which there is an absence of a compound fracture of the skull, or any apparent injury of the scalp. The indications for operations are clear when there is a fracture of the skull, since in these cases operative interference is called for owing to the local injury. It is in those cases of intracranial tension with no external injury that difficulty arises in the mind of the writer who has formulated according to his experience, the line of procedure in the operative treatment of intracranial tension in the absence of a compound or depressed fracture.

These cases of intracranial tension can be divided into two classes for the purpose of study as regards operative interference. The first class includes those cases in which intracranial tension is sufficient to produce profound coma. The second class includes those cases in which the intracranial tension is not sufficient to produce profound coma. Operation will save cases included in the first class that uniformly died under the expectant plan of treatment. Operation will save the cases embraced in the second class when the symptoms are gradually increased in severity.

In regard to the indications for operation to relieve intracranial tension in those cases included in the second class in which coma is not present, the problem is difficult of solution. The writer has been guided as to the operation by the condition of the patient after a study of the symptoms from hour to hour and from day to day. If the arterial pressure rises to a point and remains stationary, and the vasomotor system does not fail, even with a well-pronounced vagi disturbance, no operative procedure was practised, and recovery has taken place. In addition to the symptom of increase of arterial pressure the blood count must be studied, the eye grounds examined, the urine tested, the reflexes studied, the disturbances of the cranial nerves noted, and all other phenomena investigated. If the pressure is not daily increasing and the leucocytosis not rising, the red blood cells not increasing, and the urine not becoming glycosuric, the hebetude not emerging into coma, and the cephalalgia not increasing, delay in operative interference is indicated.

If all the above-mentioned symptoms from a stationary point begin to increase, operative interference is called for to save the patient's life. If on the other hand, from this stationary point all the symptoms show an improvement, operation can be deferred, at least for the present, if not permanently.

**Abolition of the Coroner's Office.**—It was voted in the Senate at Albany on Tuesday last to pass the bill of Senator Elsberg that abolished the Coroner's Office in New York city. The Assembly concurring, this will become a law, and a number of new medical positions will be at the disposal of Health Commissioner Lederle.

### A PRELIMINARY REPORT ON THE VENOUS HUM IN RELATION TO THE STATE OF THE BLOOD.

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IN the course of our systematic observation of cases in the Cornell Medical Dispensary the occurrence of a bruit in the vessels of the neck together with the normal blood attracted our attention. My impression, and I think that of most clinicians, was that the bruit was an associate of anemia, and that its presence might be taken to indicate an anemia. Our rule in the Medical Dispensary is to send all suspected cases of anemia to the Clinical Laboratory (which is a working part of the dispensary) for blood examinations.

Normal blood was frequently found in cases of marked pallor, so that the word "anemia" in our histories has been limited to those cases only where there were blood changes. Thus a group of cases developed which presented some of the clinical features of anemia, but which had not the blood changes common in that condition. While pallor might not lead many observers into the error of assuming anemia, the bruit in the neck might, and it was with the purpose of informing ourselves on this point that the cases here presented were gotten together. We have only a few of these cases showing cervical bruit with normal blood, but I am disposed to think that many have escaped us, because auscultating the vessels of the neck is by no means a routine procedure, and were there nothing else to suggest a possible anemia both this and the blood examination would be omitted. In studying these cases information was sought from the authoritative text-books. Extracts from a few of which I quote:

An exhaustive study of the literature bearing upon this has by no means been made. The extracts which I have made are the following: In describing the cervical bruit Musser (Medical Diagnosis, p. 337-8) says: "If one listens with the stethoscope over a large superficial vessel, and *does not employ pressure*, he will not detect any sound. If, however, pressure is employed, a sound or murmur is produced. The passage of the blood through the vessel produces no sound because the vessel or the tube is of equal caliber. The pressure of the stethoscope alters the caliber and compels the fluid to pass through a narrow orifice into a wider space. In this manner a fluid vein is produced. The vibration of the molecules of the agitated fluid vein produces a sound or murmur. The loudness of the sound depends upon the swiftness of the flow."

**Functional Murmurs Not Anemic.**—Drummond (p. 386) divides functional murmurs into three classes: cardiohemic or anemic; cardio-muscular or neurotypic, and cardiorespiratory; and Osler says (Practice of Medicine, p. 794): "On the right side of the neck over the jugular



vein a continuous murmur is heard, the bruit de diable, or humming-top murmur."

In explaining this bruit, Stengel says (Twentieth Century Practice of Medicine, p. 346): "This venous hum is more frequently heard upon the right side than upon the left, but in most cases, when present, is heard on both sides."

In a study of 180 cases of typical chlorosis Richardson has found a venous murmur in about one-half of the cases in which the hemoglobin was below 50 per cent. More accurately, there was no bruit in 49.4 per cent., a right-sided murmur in 33.3 per cent., a left-sided murmur in 6.1 per cent., and a murmur on both sides in 11.1 per cent. Other observers—and my own experience coincides with this—have found the venous bruit more frequent.

Allbutt in his System of Medicine, p. 502, says: "It is not difficult to suggest an explanation of the hum; that which is generally given, and which on the face of it seems most probable, is that the vibration of the walls of the vein is due to a change in the caliber of the tube at the root of the neck. The lower portion of the vein is of constant or almost constant caliber; this constancy being secured by the adhesion of the coats to the cervical fascia. Now if by any means, such as a smaller stream of blood, the vessel be narrowed above, there is a run of the blood from a narrower to a wider channel, this change in the continents sets up fluid veins in the contained blood, and the walls of the vessel are thrown into vibration thereby."

Still, although the explanation is rational in itself, yet we may ask why it occurs in some anemias and not in others? Again, why is it—as I think it is—incomparably more frequent in chlorosis than in other anemias? In my experience it is not usual to get the venous hum in plumbism, in malaria, in cancer and so forth; it may be there, but it is not to be foretold, while in chlorosis it is a fairly safe prophesy to foretell its presence.

Yet, if it be true that in chlorosis the vessels are not empty as they are in some other anemias, surely it is in chlorosis that the hum should be less commonly heard. *Perhaps the tone of the vessels enters into the causation.* Moreover, there is an old hypothesis that the hum is due to the "thinness of the blood," the corpuscular contents of which as we know are notably reduced; this hypothesis has never received much countenance from competent judges; but Potain has brought it forward again on the basis of experiment. Potain so arranges a tube in connection with a reservoir that at one time serum should run down the tube, at another defibrinated blood containing the normal number of red corpuscles; on the use of the stethoscope the murmur was heard to fall in intensity when corpuscular blood replaced the serum. Whether this observation has been verified by other observers I do not know; if so, it has an important bearing on the generation of the bruit de diable. The hum, as I have hinted, is to be heard less certainly and loudly in other veins,

in other of the anemias, and even in some healthy persons.

From the two latter quotations we get the following points: (1) Anemia may exist without a cervical bruit being present—33 to 50 per cent.; (2) bruit occurs in some anemias and not in others; (3) the bruit is more frequent in chlorosis than in other anemias; (4) the bruit may occur in healthy persons; (5) the most probable cause is variation in the caliber of the blood vessels; (6) perhaps the tone of vessels enters into the causation.

From this the following deduction may be made: From the first and second; if the anemia occurs without the bruit, the bruit is, therefore, not necessarily dependent upon anemia for its production. From the third—that if it is more frequent in chlorosis than in any other anemia there must be some condition in chlorosis which is not so frequent in other anemias.

May not this be the instability of the vasomotors? We know that chlorosis occurs most frequently in women and at the age of puberty; both the sex and time of life in which the vasomotor mechanism is most unstable.

From the fourth—that it occurs in healthy persons, that it is not an invariable sign of anemia, and that it is not dependent upon change in the blood for its production. In support of the view that the bruit is not dependent upon blood changes, the bruit heard in the neck in Basedow's disease may be cited as an example.

Apetz in a most thorough study of 600 cases (*Arch. f. path. Anatomie u. Physiol.*, Vol. CVII) comes to the conclusion that only the intense bruit heard in individuals standing, sitting and holding the head straight is to be considered as a genuine bruit. The bruit in individuals between twenty and forty years of age, if steady, has a pathological significance, but under any circumstance it has no great diagnostic value in anemia. The article is full of valuable observations.

Dr. Bewley's report in the *Medical Press and Circular*, 1891, pp. 377-378, is, while interesting, quite inadequate—as he determines the anemia by the appearance of the mucous membranes, etc., an index quite unreliable, as pointed out by Richardson (*Lancet*, Vol. I, 1891) and amply proven unreliable in our experience.

Richardson's (*loc. cit.*) tables are well worth consulting on this subject.

The cases which I report are divided into four groups: (1) Cervical bruit present, hemoglobin 90 per cent.; (2) cervical bruit present, hemoglobin between 75 and 90 per cent.; (3) cervical bruit present, hemoglobin below 75 per cent.; (4) no cervical bruit present, hemoglobin below 75 per cent.

I have considered the cervical murmurs under two heads: (1) The true venous hum which is quite characteristic; (2) a soft systolic. There is also the (3) rough systolic due to sclerotic changes in the arteries, and the (4) diastolic murmur of aortic insufficiency.

The last two must not be confused with the



## REPORT OF CASES.

	CASE	AGE	SEX	OCCUPATION	CONDITION	NATIVITY	COMPLICATION	C. SKIN	LUNGS	HEART
I	1. 4540	19	Female	Veilmaker	Single	Russian	Headache	Pale	Negative	Normal size; no murmurs
I	2. Nov. 8	40	Female	Housework	Married	Russian	Pain in right side	Pale and splotchy	Negative	Negative
I	3. July 8 Private	24	Female	Housework	Married	Austrian	Dizziness and dull pain	Fairly good	Negative	Negative
I	4. Oct. 30, 1901	36	Female	Housework	Married	Russian	Pain in abdomen	Pale	Negative	After exercise slight systolic murmur in heart
II	5. May 20, 1901 Private	20	Female	Maid	Single	German	Headache	Pale	Negative	Presystolic murmur at apex of heart; no thrill
I	6. Nov. 8, 1902 Private	24	Female	Housework	Single	U. S. A.	Headache; amenorrhea	Pale	Negative	Harsh sounds over left border sternum
I	7. Nov. 10, 1900 Private	14	Female	Schoolgirl	Single	U. S. A.	Nosebleed, headache and establishing menses	Pale	Negative	Negative
I and II	8. 2744	27	Female	Housework	Married	Austrian	Stomach trouble	Pale	Negative	Negative
III	9. 925	60	Female	Seamstress	Widow	U. S. A.	Cough	Very pale	Negative	Slight systolic sound at apex
I and III	10. 2671	29	Female	Housework	Married	U. S. A.	Dizziness; headache	Pale	Negative	Negative
I	11. 4395	20	Female	Housework	Married	German	Headache	Pale	Negative	Negative
III	12. 3526	21	Female	Fruit packer	Single	U. S. A.	Cessation menses	Moderately pale	Negative	Negative
I, II and III	13. 2772	20	Female	Housework	Single	Irish	Swelling of feet	Pale	Negative	Negative
III	14. 2707	21	Female	Domestic	Single	U. S. A.	Noise in right ear	Pale	Negative	Systolic murmur over sternum; no thrill
III	15. 2646	20	Female	Domestic	Single	Irish	Heart trouble and indigestion	Good	Negative	Loud systolic murmur at apex; not transmitted
I	16. 4344	23	Female	Housework	Single	U. S. A.	Pain in stomach after eating	Pale	Negative	No murmurs
I and IV	17. 2344	20	Female	Salesgirl	Single	U. S. A.	Cough	Pale	Negative	Soft systolic murmur heard up left border of sternum
IV	18. 1240	14	Female	Schoolgirl	Single	U. S. A.	Epigastric distress	Fairly good	Negative	Negative
II	19. 755	22	Female	Housewoth	Married	West Indies	Headache	Dark	Negative	Tumultuous, but regular; no murmurs
II	20. 200	23	Female	Cigar overseer	Single	U. S. A.	Loss of appetite	Pale	Negative	Negative
I	21. Private Nov. 15th	35	Female	Masseuse	Single	Irish	Headaches	Pale	Negative	Negative
I	22. Private	25 ?	Female	Housework	Single	U. S. A.	Headaches	Pale	Negative	Negative
	Summary	14 to 20—8 21 to 30—10 31 to 40—3 41 — 1	All Females		Single—13 Married—8 Widow—1		Menstrual—1 Headache—8 Loss appetite—1 Abdominal pain—5 Cough—2 Dizziness—2 Heart trouble—1 Tinnitus—1 Swelling feet—1	Pale—18 Good or fairly good—4	All Negative	Negative—4 Bruits—7 Tumultuous—?

## REPORT OF CASES.

BRUITS	KIDNEYS	OTHER VISCERA	LACING	D. VENULES, VAR. VEINS OR EDEMA	BLOOD	VESSELS
At base of heart and on right side	Not palpable	Liver normal; abdomen relaxed	Has probably laced too tightly, as she is now unable to wear corsets without distress	D. venules present	Hemoglobin V. F. 100 to 105 per cent.	Not noted
Bruit in right side of neck	Not palpable	Abdomen relaxed; liver slightly enlarged	Indefinite	Slight varicosity	Hemoglobin V. F. 90 to 95 per cent.	Moderately thick
Large roaring bruits on both sides of neck	Right kidney distinctly palpable	Liver slightly below costal margin; relaxed	Constantly laces tightly	Numerous in thighs	Hemoglobin V. F. 90 to 95 per cent.	Soft
Soft bruit on right side of neck; not constant; disappears two or three beats returns two or three beats	Not palpable	Abdomen pendulous; relaxed	Does not seem to lace tightly	D. venules present in thighs	Hemoglobin V. F. 90 per cent.	Soft
Bruit in right side of neck	Not palpable	Tenderness over the liver; relaxed	Does not lace tightly	D. venules present	Hemoglobin V. F. 85 per cent.	Soft
Soft bruit, right side; occasionally humming	Not palpable	Abdomen relaxed	No tight lacing	D. venules present	Hemoglobin V. F. 90 to 95 per cent.	Soft
Bruit on right side of neck	Not palpable	Negative	No tight lacing	D. venules absent	Hemoglobin V. F. 90 per cent.	Soft
Bruit, right side of neck; still present	Not palpable	Negative	?	D. venules absent	April 5. Talq. 70 to 80 per cent.; Nov. 3, 90 to 95 per cent. Talq. V. F.	Moderately soft
Load bruit, both sides of neck; none up sternum	Not palpable	Negative	No tight lacing	D. venules absent	Hemoglobin V. F. 35 to 40 per cent. Talq. 1,276,000	Secondary anemia
Load bruit to right of neck	?	Negative	?	D. venules absent	Mar. 25. 90 per cent. Hemoglobin; Nov. 10, is pregnant; hemoglobin, 60 to 70 per cent. Talq.	Soft
Load bruit, not constant	Not palpable	Negative	Moderately tight	?	95 per cent. Talq.	Soft
Soft bruit in right vessels of neck and over sternum	Not palpable	Negative	Does not lace tightly	D. venules absent	Hemoglobin V. F. 70 per cent.; Talq. 60 per cent.	Soft
On right side of neck distinct; less distinct on left	Negative	Negative	Does not lace tightly	?	Hemoglobin V. F. 70 per cent. Talq. 70 to 80 per cent.; Hemoglobin 80 to 90 per cent.	Not noted
Load bruit whirring at right side of neck; less marked on left	?	?	?	?	Hemoglobin 35 to 40 per cent.; R. B. C. 4,760,000	Not noted
Rough sound on right side of neck; no bruit	?	?	?	?	Hemoglobin 55 per cent.; R. B. C. 4,842,000	Soft
On both sides of the neck and up left border of sternum	Not palpable	Abdomen protruding like that of an old woman	Probably laces too tightly	Numerous over body	Hemoglobin 90 to 100 per cent.	Soft
Feb. 8. On right vessels on right side of neck; March 11, bruit still present	Not palpable	?	?	?	Feb. 8. V. F. Hemoglobin 65 to 70, Talq. 50 per cent.; March 18, Hemoglobin 105 to 110 per cent. Hemoglobin V. F. 65 to 70 per cent. R. B. C. 5,000,000	?
No bruit on neck	Negative	Negative	?	?		?
Bruits on both sides	Negative	?	?	?	March 5. Hemoglobin 75 to 80 per cent. V. F.	?
Bruit on left side of neck; Dec. 30, none; July 1, no bruit; June 1, on right side of neck	?	?	?	?	July 24. Hemoglobin 80 to 85 per cent. V. F.; Dec. 30, 85 to 90 per cent. V. F.; Nov. 15, Hemoglobin V. F. 90 per cent.; bruit still present on right.	?
Systolic bruit right; less marked left	Not palpable	Negative	?	Numerous D. venules; some v. veins	Hemoglobin 90 per cent. V. F.	Soft
Bruit to right, none to left	Negative	Negative	Does not wear corsets	Absent	Hemoglobin 90 per cent. V. F.	Soft
Bruits—21 No bruits—1	Negative—17 Palpable—1 Not examined—4	Negative—10 Relaxed—7 Not examined—5	No tight lacing—8 Information not obtainable—9 Tight lacing—4	D. venules: Present—3 Absent—8 V. veins: Present—2 Absent—1 Edema: Present—? Absent—? Not exam.—9	Hemoglobin 90 per cent.—14 Hemoglobin 75 to 80 per cent.—3 Hemoglobin below 75 per cent.—6	

bruit under consideration. Only the soft systolic heard in anemic conditions can be classed with the true *bruit de diable*.

In conclusion, I may say that we had many more cases than those here reported, but the data were insufficient from which to draw inferences and these cases were therefore omitted. At first the impression was that we were possibly dealing with incipient chlorosis, that in the thorough examination of these walking cases we had observed the condition earlier than usual. This I think now is incorrect. The thought of a pseudo-chlorosis occurred as there were in many cases all the symptoms of chlorosis without the blood change. With the idea that general loss of arterial tone might be a cause for this bruit, I consulted our histories of cases of splanchnoptosis under which head we include all cases of floating or displaced kidney or other viscera. The cervical vessels were not examined in these cases, so that these histories were not available for our purposes. We will not attempt to explain this bruit without more thorough laboratory examination of the blood. The practical point to a clinician is that pallor and even a cervical bruit may not indicate anemia, that is blood impoverishment, and that the blood should be examined to determine this point. Moreover, the treatment would be influenced by the finding of a normal blood condition, and if the suggestion that the vascular tone is faulty be correct cardiovascular stimulants would be indicated and not the exclusive administration of iron. May not this be the condition of those cases of supposed anemia where strychnine in large doses and not iron does good. There are, of course, many interesting investigations suggested by this study, "such as the specific gravity of the blood," "the so-called hydremic state, arterial tension, etc.," but I have endeavored to present an observation which may be made by a practitioner with a stethoscope and a hemoglobinometer, and from which helpful information for diagnosis and treatment may be had.

I wish to thank Dr. L. A. Conner for calling my attention to some of the references, and Dr. M. Schoenberg for his review of the German literature bearing on this subject.

#### SOME PHYSIOLOGICAL OBSERVATIONS ON A CRUSTACEAN HEART.\*

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THERE is a field of animal experimentation which has been exceedingly little worked as yet, indeed practically not at all. The reference is to small and more or less transparent animals, small enough to be, perhaps, comprised within the field of a lens or of a microscope, and transparent enough so that some or even all of the internal mechanisms may be observed directly. Some interesting researches, to be sure, have been

recently made into the locomotion of infusoria and of other orders, and many have worked to excellent advantage on the various *taxes* of numerous forms of small animals; numberless and very laborious studies have been carried out of course, on the anatomy, gross and histologic, of all known species of animals; and surely far-reaching experiments have been made recently concerning the regeneration of many simple forms. Still, none of these varieties of research more than borders on the field which is suggested here. Many of these small animals, not yet subject of true physiologic inquiry, have complex organizations, the larger forms of life in miniature almost, while in others one has for his observations and experiments a set of organs similar in general function to their congeners even in mammals, but oftentimes so simplified in their actual structure that they may be studied to much better advantage in many directions. Thus in these small forms (any systematic textbook of zoology will suggest their names and structures), very often one finds before him for experimentation an organ like the mammalian or reptilian organ in all essential respects, but often much more suited to use because relatively free of various complexities and difficulties which, in the mammal or the reptile even, complicate and hinder. The most basal functions are in the "lowest" and the simplest as perfectly performed as in the highest and most evolved—and it is these basal functions of life with which physiology chiefly is concerned. In simple, usually small, animals one sees the type, and so displayed as to be seen most easily. More and more continually does physiology seek in the cell what formerly the total organ or tissue was expected to reveal, but could not. To employ more often these minor animals is only a step in this same direction, for whether unicellular or merely relatively minute and highly organized (as, for example, the crustacea), the structure is comparatively simple and correspondingly close, in general terms, to the morphologic, and so to the physiologic, type. Besides this theoretic advantage of studying small animals, there are others of a practical nature which, like the disadvantages, need not be recounted. The laboratory which is equipped with a small Roentgen ray apparatus applicable to the stage of a microscope, has a field for research not confined to animals which are by chance covered with a transparent tegument. With such an instrument much might certainly be learned of permanent value to biology.

In the study of viscera in particular, the employment of animals small and transparent enough to be seen all at once and at a glance, has especial advantages, for only so can the functional relations of these be determined. Scarcely any condition of change is confined to one viscus or to one organ alone, and to know how other viscera are affected often gives hints else missed. For example, in studying the heart, one needs to know the relative condition of the

\*From the Laboratory of Physiology of the Tufts College Medical and Dental Schools.



circulation, the degree of the activity of the other viscera, the general vigor of the animal as indicated by the voluntary movements, and the excitement of the nervous system perhaps. The small Cladoceran branchiopod *Daphnia* is particularly well adapted for use in this direction, the animal, although encased in a shell, being completely transparent, neither so large that it cannot be observed all at once with a low-power objective, nor so small that its organs cannot be clearly made out in all their molar movements. This animal is to be had in ten minutes in thousands during the summer and autumn from almost every permanent pool, the Back Bay fens of Boston, for example, furnishing from an area of two square meters a supply of *Daphnia* ample for a winter's use, especially when it happens that successive generations appear in the aquarium. The animals are very hardy and live indefinitely in a vessel holding a few liters if they be supplied with a proper environment in the shape of decaying animal and vegetable matter, some few living water plants and in the absence of larger animals, e.g., young fish, which devour them in multitudes. Several small glass vessels, as for instance the crystallization dishes of the chemist, make their preservation more certain than it would be were the animals all in one aquarium.

The particular crustacean species employed for these observations was *Daphnia pulex* DeGeer, although other species of *Daphnia* seemed to present in much smaller numbers, all however being practically, that is for practical physiology, alike. This animal in its adult condition is very rarely over two millimeters in length including the long antennae extending anteriorly and the sharp considerable spine guarding the animal posteriorly. The animal is very thin laterally, rather broad dorso-ventrally, so that it lies easily and quiet on the microscope slide and gives a minimum of depth to the view. Hence in part the extreme transparency of the animal. It is one of the commonest of the smaller animals studied in the average elementary course in zoology.

The heart of this species is suitable for physiologic study for several reasons, some of which are obvious. All these represented may be readily made out with a one-third objective if properly focussed and lighted, despite the extreme transparency of the cardiac protoplasm. As one may readily see, this heart is morphologically almost the type of a pumping organ, for it consists almost wholly of two series of muscular cells arranged side by side on either aspect of the dorso-ventral plane in a manner to form an ovate sacculle. These cells are almost typical smooth muscle cells of a blunted fusiform shape, and by their simultaneous shortening produce the systole of the viscus. The nuclei of these simple heart cells can be readily made out in the living animal under a low-power objective. Whether divided anatomically or not into two chambers, an auricle and a ventricle, is not to be made out directly, but occasionally there is physiologic evidence that such is the case. From the side, the

heart exhibits two openings one, conspicuous sometimes, near the center of the organ, through which, and its counterpart on the other side, the blood enters during the diastole, chiefly it is evident by aspiration; the other opening is in the anterior end of the heart in the median line, and through it the circulation passes. Each of these three openings is supplied with a simple but effective valve in the form of a delicate flap, to prevent regurgitation, that of the outlet of the organ, opening outward, being sometimes readily seen in action, but the others less often because they are within and usually observed broadside and not on edge like the anterior valve. The heart pulsates with apparently the utmost freedom in a considerable enlargement of the dorsal blood-sinus lying anterior to the brood-sac, the sinus being normally filled with the transparent and colorless blood. The only apparent attachment of the heart is on its ventral surface where a thick and movable membrane of cells anchors it to the substantial dorsal border of the alimentary canal. The blood comes to the cardiac sinus by well-defined channels on either side of the brood-sac, and soon after leaving the heart spreads well over the head to nourish the numerous organs there situated, thence collecting somewhat and passing into the trunk to be oxidized by the "lung-feet" in the ventral cavity. The histologist certainly has a chance to do useful work by tracing out the nerve-supply of some of these simple sorts of animals; thereby knowledge of their functions may the sooner follow.

Here, then, in *Daphnia* one has for study a heart wellnigh typical in its structure and relations, indeed, almost such a heart as an experimenting physiologist might wish to construct that he might thereby study in their simplicity the conditions underlying as general principles of action the vast complexities of the mammalian circulation. It is composed wholly, perhaps, of a layer or layers of smooth muscle cells joined by a stout ring of muscle in the median line. There are no complicating blood vessels, no intricacy of inter-related nerves to be unraveled or else guessed at, few or none, in short, of the conspicuous difficulties which arise from the high development of the mammalian blood-pump so easily deranged and killed. Its simplicity simplifies the problem somewhat. On the other hand, this organ is minute (rarely more than say 0.15 m.m. in length) and not subject therefore to the direct application of apparatus, canulae, oncometers, etc. Again, the Cladoceran animal is a long way from the mammal and generalizations between the two correspondingly uncertain, although *Daphnia's* heart has plenty of interest in itself without thought of further reference. But what is of most importance perhaps, the biogen composing this heart is in its purest form, and freely exposed to the observation of the lens-aided eye; one can watch it beat, observe its shape changing under varying conditions, study its condition in collapse, in short, see it all through and compare it immediately with other organic events. In addi-

tion to the adult animal for study, one has in observing *Daphnia* very often an excellent opportunity to compare therewith the embryonic stages. In the brood-sac lying posterior to the heart one generally finds from two to five young animals, the very large majority of the specimens of this genus taken in any dredging or raised in the laboratory being females. By examining many individuals successively, within an hour one may see practically every stage of embryonic life and study it with the utmost facility, from the fertilized ovum in a late mulberry stage to almost the adult form. Before leaving the capacious brood-sac of the mother the heart, eye, gut, etc., have practically their adult form and may be readily observed even with a low-power objective. Thus, e.g., one oftentimes may compare the pulse-rates of three or four embryos of one brood or the heart-rates of these with that of the mother. There too is an excellent place to study the segmentation of the ovum long before it reaches the brood-sac, and the daily development later, the tissues being so thoroughly transparent.

To note, then, certain conditions of the varied action of this protoplasm organized into a perfect heart, under a few simple but varied states is the object of this all too fragmentary report.

In these observations of *Daphnia* "Leitz" objectives Nos. 3 and 7 were used, with oculars 1 and 3. With an average-sized animal, objective 3 and ocular 3 gives a field just about filled, but with the combinations possible with these lenses practically all may be seen which is observable at all in the living unstained animal, the blood corpuscles, e.g., being plainly visible with the combination of obj. 3 oc. 1, and not better with a 7-3. The tissues readily take up during life the common methylene blue stain, but the advantages of its use in so accessible an organ as the heart of *Daphnia* are doubtful. By lowering a 4 mm. glass tube closed by the finger at the top over or very near one of the animals gently jumping about usually near the bottom of the aquarium, the specimen was quickly secured when the finger is removed and the water fills the pipette. It was then put on a slide, most of the accompanying water turned off, leaving the little animal, very flat, lying on its side in a thin layer of water, all the organs fully exposed to view; a cover glass was never applied because oppressive to the specimen and moreover of no use in nearly every case. Thus the animal was observed in a condition absolutely normal, save that it lay on one side instead of jumping upright by means of its large and powerful antennae in the water. (This jumping locomotion is quite characteristic of the genus and doubtless accounts for the common name of the animal which is "water-flea.") The whole general impression gained from a glance at *Daphnia* so placed on a slide under a low-power objective is one of extreme activity, for various visceral movements are conspicuous. The largest moving mass to be seen is that which apparently fills the ventral portion of the animal nearly the whole length of the alimentary canal;

these organs are the lung feet, if one may call them so, continually moving for the purpose of respiration, and with a rate oftentimes synchronous with each other and with the heart. The alimentary canal, a prominent dull greenish-yellow tube extending through the animal exhibits movements usually more or less rhythmic in nature, the chief motion noticeable being a gentle surging back and forth of the nutritive material throughout the greater part of the canal, with the periodic pulsation of the c-shaped digestive gland, closed at one end, extending anteriorly from the gut. Dorsal and anterior to the prominent intestine beats rapidly the heart, in a capacious sort of compartment or sinus of its own. Posterior to the heart is situated the brood-sac and this in the female almost always contains two or more embryos which occasionally struggle violently as if to escape into the world, while, if they are old enough, visceral movements are taking place in them quite similar to those of the parent. At the extreme anterior end of the animal is the very prominent single eye, the only strictly opaque object in the body except the filled portions of the alimentary canal. This eye is in continual gentle oscillation, and the three muscles which move it (each made up apparently of a single nucleated muscle cell) are plainly visible. Occasionally the long and slender feather-like antennae jerk in their characteristic way. At times the posterior end of the abdomen straightens out perhaps to void feces or to push away disturbing masses of vegetable matter which have floated against it. In a suitable light the blood's circulation is plainly visible by means of its large corpuscles, and is especially plain in the head in around the brain and its ophthalmic ganglion, about the eye, just under the shell in the posterior end of the animal, and along the dorsal sinuses if the brood-sac be not over-distended with ova or embryos. If one may judge by the rate through the sinuses, a corpuscle may make a complete circulation in from ten to twenty seconds. These are the most prominent of the gross phenomena obvious on a cursory look at the object under low-power, and combined they make a picture of organic activity of no little physiologic interest, especially to a student of visceral coordination under various conditions.

## II.

The first series of observations as to *Daphnia's* heart was directed toward a determination of the pulse-rate. This has not only a certain interest in itself, but it served as a norm with which the rates in various other cardiac conditions might be compared. As the heart even of an adult specimen is not over 0.15 mm. in length and often in practical runs of specimens much less, to apply any sort of a sphygmograph to it was of course out of the question, especially since the body of this species, save the head, is enclosed in a tough chitinous shell, quite transparent but fairly strong, and not removable without tearing the



animal into parts. But to determine the pulse-rate a simple method was at hand, not as exact in its details as would be the action of a true sphygmograph or plethysmograph, but productive of results invariable far within the organic variation. There was arranged a Morse key actuating an electric pen writing on a kymograph drum above a tracing marking seconds from a clock circuit-breaker. Having had considerable practice in imitating rhythms, it was an easy matter for the experimenter by observing the heart through the microscope to indicate by taps of the key its pulse-rate on the smoked paper,—a record which may be called an indirect sphygmogram, and accurate to any required degree except as regards cardiac events invisible to the eye but which an ordinary sphygmograph might record. The heart-rates of a large number of individuals were recorded in this way, all ages and sizes and both sexes being represented.

The rate varies among different specimens much more than in the higher orders of animals. Comparatively many have a rate slower than the average, and in a smaller number the heart beats much faster than normally it does. When these variations do occur it is noticeable that they are considerable, but individuals may be not rarely observed with rates half or two-thirds the average,—the variations are seemingly not more frequent than in higher developed species, but, when they do occur, much greater. The average pulse-rate of this species, at least in these conditions, may be put at 240 per minute. For embryos the rate progressively increased with their ages, but in general is much less than in adults, a half or a third that of the maternal heart near by. This is a matter of considerable theoretic interest, as being quite opposite to the relation obtaining in vertebrata orders of animals, the pulse-rate of a human fetus, *e.g.*, being double that of its mother instead of half that of its mother as in *Daphnia*. The former fact has been explained tentatively by the lack of development of the inhibitory cardiac nerves, an explanation open to discussion, with small expectation of proof one way or another. In the case of *Daphnia* there is excellent evidence that in the adult inhibitory nervous influences have much to do with the function of the heart, while all trace of augmentor nerves is lacking. It is clear then that the above suggested explanation cannot also apply to *Daphnia's* heart, for with a supposed similar neurology, the physiological effect is quite opposite. Such facts as this of the Cladoceran pulse-rate serve to illustrate well how complicated is the problem of inhibitory nervous influence in general.

This normal adult heart-rate of 240 is an average of many individuals, and individual differences seemed to be great as one viewed many hearts of specimens taken at random from the aquarium, although the large majority were very close to 240. A previous research\* on crustacean individual differences failed to reveal, in the cray-

fish, anything like permanent individual characteristics such as one sees, *e.g.*, in mankind, hence, it is *a priori* probable that these pulse variations noted in *Daphnia* are either temporary conditions (no observation here lasted over two hours), or else differences due to the greatly varying ages of the specimens observed, the *Daphnia* having among them individuals comparatively young and others relatively old, with a comparative range very much greater than was the case with *Cambarus*, *Daphnia* living but a single summer while *Cambarus* may have a life-period of many years.

Concerning the rhythm of the heart-beat one thing was especially striking throughout the research, namely the persistence of the rate under many very "adverse" circumstances. Evidence of this is amply supplied below under the respective conditions of the experimentation. So marked is this persistence in the case of *Daphnia* that the conclusion is irresistible (although probably not literally exact) that the rhythm is inherent in the protoplasm and alters only with actual alteration of that protoplasm as metabolic energies. One is reminded irresistibly of ions and of "reversible hydrosols," and is firmly convinced at least of muscular automaticity.

This heart has under different conditions various shapes and apparently some variation in the contraction-mode of its parts. Sometimes the heart beats full and round, sometimes it shortened somewhat anteroposteriorly, sometimes even diastole leaves the organ much flattened dorsoventrally, and under very abnormal conditions coordinated systole is abolished for a time or permanently and each segment contracts independently and very irregularly, making a functional state of chaos and active disorder as different as possible from the highly perfect mechanical regularity of the normal heart. All these more or less abnormal conditions may be stages merely of protoplasmic collapse, perhaps degrees of muscular tetanus accompanied by fibrillary activity. There is more evidence of an active diastole in *Daphnia* than is easily found elsewhere, if appearances and the time relations of systole and diastole are of any value as indicators.

### III.

A series of experiments was made on the phenomena to be seen when the animal was allowed to dry up on the glass slide under the microscope. By removing carefully with a rolled bit of filter-paper all the water not actually in contact with the animal, the process of drying in the cool laboratory was so slow that the specimen was not wholly dead for a period varying from one-half hour to one hour.

As the water left the viscera and organs, they one by one stopped their movements, more or less gradually. In some cases, a number of minutes before there was final quiet the muscles of the eye underwent tonic spasms alternately at intervals of a few seconds so that the eye was rotated by turns upward and downward to the limits in a

\*Dearborn: "Notes on the individual Psychophysiology of the Crayfish,"—*Am. Jour. Physiol.*, III, 9, April, 1900, pp. 403-433.



very striking manner, this being due, if one may judge by the appearance of the drying protoplasm, to osmotic disturbance in the ophthalmic ganglion to which the eye is attached. These movements continued until the muscles were obviously dry. Another interesting phenomenon of drying outside the heart was the active reverse peristalsis of the gut. This started near the caudal end of the canal, and in one-quarter second ran upward half the length of the gut, the digestive gland showing its contraction about two-thirds of a second later. This reverse peristalsis became more and more conspicuous until the outside of the intestine became too dry for the proper contraction of the circular fibers which alone seemed to be concerned in these remarkable phenomena. In normal digestion peristalsis is not apparent—one sees a gentle surging up and down the gut, but its cause is not visible, whereas the reverse peristalsis was marked both in vigor and in speed.

The eye was one of the last organs of the body to cease moving, but for several minutes after it had dried the heart continued beating almost normally both in rate and intensity, with perhaps only a slight diminution in its general size. There was in one or two cases a period of somewhat lessened rate corresponding temporarily with the cessation of the circulation and possibly connected causally with that fact either in the way of nutritive decrease or of a lessening in the hydraulic resistance. Within the last five minutes or so of the heart's action its shape changed somewhat, becoming a little smaller and flatter to a degree dorsoventrally, this change of shape corresponding to a shortening of the elongated cells making up the heart.

The interesting thing for our present purpose in these phenomena of a drying organism is the persistence of the heart's activity beyond that of all the other viscera. This is to be accounted for apparently only on the supposition that the heart has in it more vigor of motion, more of automaticity, so to say, than other organs have. It is certainly not to be explained by any conjecture that the heart remained wet longer than other viscera, for the shell of *Daphnia* is open dorsally just over the heart while the fine, spongy structures, e.g., on the ventral side of the animal and especially the alimentary canal, are much further removed from the drying air than is the heart, yet these were still long before the latter was disturbed in its normality of action. The pulse-rate persisted in a remarkable way, not decreasing appreciably until the very last few minutes of the drying, when it lessened on the average perhaps 40 per cent., the movements of the heart getting seemingly more and more difficult until the decreasing fluidity of the drying protoplasm at last stopped all motion forty or fifty minutes after the water was poured off from around this minute animal. The pulse-rate seemed to lessen only when the cells of the heart had actually begun to die from the structural derangement of their protoplasm.

In one case observed in this direction, a drop of water was poured around the animal some seconds after the heart even had become still. In four seconds feeble beats began, but after continuing for six minutes they gradually stopped again while the other viscera then began to move; three minutes later the heart rather suddenly began to beat once more; in twenty-five minutes it was beating eighty times a minute, but jerkily and small, with no circulation visible; in twenty minutes more the circulation became apparent along the dorsum of the gut, and the animal thereupon, including the heart, set up its normal multiform activity. In another attempt to observe the order of organic revival thus, the interval between the apparent cardiac death and the addition of water was as long as ten seconds, and there resulted only the feeble fibrillary (?) contractions in individual heart cells already noted, and these soon died out. These peculiar movements of the collapsed individual heart cells were conspicuous throughout the observations, occurring when the heart's tissue was badly damaged in any way. They may be ill described as an active irregular churning or surging of the flattened heart, the collapsed viscus reminding its observer strikingly of the unrestrained dashing up and down of an active and choppy sea,—an effect as different in kind as possible from the beautifully perfect coördination, the machine-like rhythm of the normally beating heart. These movements exhibit strikingly the activity which is in each cell, inherently, of the heart, and they imply not less strikingly the use and probable delicacy of whatever the mechanism is which coördinates the cells and makes them useful elements of an eminently useful unity, a normal heart.

#### IV.

Many experiments were made to determine the effects on the heart of mechanical injury to the nervous system. Is the Cladoceran heart in this respect similar to the mammalian heart, sensitive to every considerable shock, augmented or inhibited by strong nervous messages from whatever source they may come? In the absence of detailed anatomical neurology, what neural supply can be physiologically shown to belong to this heart so relatively low in the zoologic "scale?" Are augmentor or inhibitory nerves, or neither, the more primal in the plan of cardiac control as evolved thus far? It will be seen that only the brain proper and the mere beginnings of trunks extending from it are known, the lobster and the crayfish being the only crustaceans whose nerves are understood. On morphological principles we may be sure that a considerable nerve runs along the alimentary canal somewhere, connecting the brain with an important center in or near the bend of the abdomen—guesses which these experiments also have suggested and wellnigh proved true. Moreover, a nerve to the heart is practically certain, but its relations still are in doubt.

The first part of the experiments involving injury to the nervous system were of the nature of acute stimulation or of actual puncture. A very fine steel needle in a handle with 2 mm. of the point bent at right angles was the instrument employed, and the stimulations were made usually on the stage of the microscope, thus insuring exact localization of the injury, although compared with the nerves of *Daphnia* a millimeter or two long, the finest instrument producible is clumsy indeed. These experiments were conducted, however, in a way which assured that possible uncertainties arising from too extensive injury by this relatively awkward instrument should offset each other. So small is this animal that exact determination of the location of specific centers was not attempted, it being impracticable without, at least, some apparatus of extreme delicacy for exactly localizing punctures much smaller than those of the finest needle. The present research contemplated no such anatomical study, but only the generalities of the heart's control, if any exist, by the nervous system. From a large number a few experiments have been selected for report in detail, so far as detail is recordable in experiments on so small and delicate an animal. Each case represents the tests made on a different and perfectly normal individual. (1) Puncture through about the center of the brain stopped the heart, the oscillations of the eye and the movements of the feet except those lying most posteriorly. About two minutes later the heart began to beat very slowly and feebly, especially its anterior portion, but this decreased shortly and the heart stopped. (2) Another similar puncture of the brain a little to one side of the place where the puncture in the first instance was made, produced no apparent effect on the heart whatever. (3) In another experiment, ten complete punctures within five minutes, disintegrating apparently practically the whole brain, caused no obvious cardiac effect save a slowing of the pulse rate of about 35 per cent. after the last of the punctures. The heart then gradually lessened the full extent of its systole, especially that of the posterior (or auricular?) part, and gradually slowed somewhat; in about seven minutes from the time of the last puncture the heart suddenly stopped, although the legs were still actively moving and at their normal rate. (4) A fine puncture of the brain in its extreme ventral portion caused no obvious effect on the heart. (5) Puncture in the posterior part of the larger mass of the brain stopped the heart instantly; in two minutes it started again, but stopped three minutes later. Half an hour later heart was beating, near systole, at 115 rate, with nothing else in the animal to be seen which was abnormal. (6) Puncture on dorsal anterior side of brain produced no manifest effect on the heart. (7) Puncture in the region of the posterior bend of the gut (where, it has been already said, there seems to be a nerve center of some sort) caused heart to stop instantly; it began to beat again in one and a half minutes, and plainly at the anterior end

of the heart, the contraction in the course of two seconds spreading thence over the whole heart, until it beat normally. Another stimulation of the same individual one-seventh the body length toward the head caused the heart to again stop, the beat being resumed in three minutes. A third gentle puncture in about the middle of the body caused once more an instant standstill; eight minutes later spasmodic but "fibrillary" contractions of the heart began in the posterior part of the heart or auricle. Few animals exhibited the cardiac inhibitory function as perfectly as did this specimen, although stimulation in the posterior part of the body is much more emphatically inhibitory than is that of the brain proper. These posterior stimuli do not cause the eye, on the other hand, to stop. (8) Puncture ventral to the heart and to the gut, opposite the former, stopped heart instantly, the partial incoordinate movements beginning five minutes later. (9) In another similar experiment heart began to beat two minutes after the inhibition. (10) In another, heart began in three minutes.

These examples of the many puncture and stimulation experiments of this research, taken almost at random from the notes, are sufficient to show the trend of the probability, at least, concerning the nerve supply, in part at least, of the heart. As has been said in advance already, augmentor influence was never observed to follow neural stimulation; on the contrary, whenever any cardiac effect was appreciable at all it was invariably in the direction of inhibition, the heart was lessened in the vigor of its systole, the extent of its diastole slowed or instantly stopped. The experimental facts are interesting, for they strongly imply that in this simple heart, at least, the preponderating neural influences are wholly inhibitory, for the probable nervous system was well gone over in these stimulation experiments, and undoubted augmentation never occurred. The drying experiments already reported, as well as others yet to be described below, indicate that *Daphnia's* heart has an extreme persistence of rate and vigor of its own, which can be lessened permanently only by the most powerful of agencies, such agencies in fact for the most part as actually disorganize or tend to disorganize the protoplasm of the neuro-muscular cardiac mechanism. We have seen, however, that temporary inhibition is easily brought about from nearly all parts of the central nervous system. These two circumstances combined (the inhibitory influence of the stimulation of nerves and the extraordinary automaticity of the heart itself) make the supposition emphatic that the cardiac muscle cells set the pace and that the nerves probably in connection with them inhibit or tend to inhibit their action. Nerves restrain the heart when organic need arises. Only by such supposition do the facts brought to light by these simple experiments get adequate explanation. If, with further evolution beyond Cladocera in the animal "scale," augmentor nerves have been developed to better adjust the



action of the heart to the ever-complicating relations of complex organs, still in relatively simple *Daphnia* these augmentor nerves are lacking, or, if present, are not stimulated to action by any agencies employed in this research. The heart perhaps looks to its food for strength and to the normal composition and metabolism of its protoplasm for its proper speed of effort, but to its nerves for the influence to rest when it should be less active for the bodily good and to save its strength when there is opportunity. Indeed, it is rather more than possible that this principle may obtain in many organs of many forms of animal life; numerous facts suggest how very widespread is the importance of inhibitory energy in physiology. Be the principle as it may, one sees in *Daphnia* only inhibition of cardiac function, and rarely or never augmentation.

(To be Continued.)

#### PNEUMONIA: AN INFECTIOUS DISEASE.

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It is only in late years that this disease has been generally recognized as one belonging to the infectious group. All kinds and conceivable theories have been advanced to account for it being so widely disseminated. Even at the present date few will believe that the effect of cold (as such), is not in itself the sole cause for pneumonia, but one will be more apt to accept the theory of infectiousness if told that there is as much if not more pneumonia in temperate climates than in the extreme cold of the northern States or of Canada. Such however is a fact.

Because of the exposed condition of the lung to the vicissitudes of weather, and noting that the majority of attacks come on during the winter months, we long labored under the delusion that sudden exposure to cold and dampness were the sole etiological factors in producing the disease. It will be attempted to present sufficient evidence to prove the position maintained by several writers that exposure to cold or cold and dampness are merely incidental and remote factors. That it is caused by the pneumococcus is as nearly certain as the skill of careful experimentation will allow.

The exposure theory has been severely attacked by many on purely clinical grounds and by none more logically than Woods Hutchinson when he pointed out that, "Fatal lung diseases in any given race or class, particularly of tuberculosis and pneumonia, is in exactly inverse ratio to the amount of exposure to all sorts of climatic vicissitudes. Diseases of the lungs are emphatically diseases of city dwellers." (Human and Comparative Pathology.)

His position is undoubtedly correct whether applied to man or bovines, and to make it more emphatic in reference to man attention is directed to the mortality lists of certain cities and States. It is emphasized that pneumonia is a

disease of overcrowding and not due merely to cold or exposure to cold or to constant living in dampness or a damp climate.

One will be astonished to find that statistics show that in the cold of the North where the exposure must be severe there is no greater ratio of fatality from pneumonia in a given number of population than in the milder climates further south if the environment conditions are the same. That the percentage of deaths in a given number of cases of pneumonia is very much higher in the North during the extreme winter months there is not the slightest question. This I believe to be due rather to the heightened virulence and greater numerical dosage of the infecting organism at this time than to the cold per se. Knowing that there is a greater percentage of recoveries from the disease in the South it is probably true that there are more cases to a given population than in the North. I have no way of ascertaining these figures, however, as the reported death rates are the only figures at hand.

It is quite true that nearly all the cases of pneumonia occur in the three winter months of January, February and March. But this is true of influenza also and the explanation of one will probably apply to the other. For whatever be the cause it would also explain the greater frequency of nearly all the acute infections, especially of smallpox. Neither pneumonia nor tuberculosis is due merely to the greater degree of cold. I would seek the explanation for pneumonia and influenza in these months to the greater dosage of the contagium due to the overcrowding and overheating that one sees in theaters, street cars and other shut up, stuffy places where the heat is great enough to desiccate the germs of these diseases which have been planted in such places, mostly by coughing and spitting. Fresh air and ventilation stop all of them promptly. If contracting a "cold" is the *sine qua non* for an attack of pneumonia we should have the greatest number of cases in the fall and spring, for it is then certainly that we have a greater frequency of chilling of the body.

Auto-infection in pneumonia, directly into the lungs from the mouth and pharynx, is extremely doubtful. It is probable that the pneumococcus is first ejected by the saliva in spitting and, having dried, enters the lungs in dust and this is what happens in overcrowding in our city lives.

This question of influence of cold and crowding is very noticeable if the figures for the smaller and newer towns where there is little overcrowding are taken in comparison with large cities in the same localities. For example take Boston and Worcester. In 1900 in Boston with its overcrowding there were 24.98 deaths from pneumonia to every ten thousand inhabitants, while in Worcester there were only 16.12. Making the parallel more remarkable take Albany with 17.74 to ten thousand and we have Atlanta with practically the same population with 21 to ten thousand.



In comparing the States it was found that in those that are sparsely settled there is little pneumonia. This is true whether north or south. Minnesota for the last ten years had an average of six deaths for each ten thousand population, a very small rate for pneumonia in a very severe climate. Even California and Louisiana are greater with 9.54 and 11.38 respectively. Taking Chicago out of the calculation of Illinois it was found that that would make the population condition about the same as Indiana and the percentage of deaths in these States are then practically the same, while Georgia with a little less population than Indiana has practically the same number of deaths from pneumonia.

There can be no doubt that this disease is one of city life rather than life in the country. It is the disease of segregation, not of isolation, and it would seem to be a disease of overcrowding rather than exposure to cold; hunger, cold and alcoholism being merely agents that favor the disease and apparently influence its mortality.

The following mortality table was compiled principally from the census figures of registration cities and States:

	Population.	Deaths from Pneumonia.	Per 10,000.
1 Boston .....	500,000	1,260	25.20
2 Worcester .....	118,421	191	16.12
1 Chicago .....	1,500,000	2,550	17.
1 Milwaukee .....	250,000	260	10.40
1 New Orleans .....	265,000	500	18.87
2 Buffalo .....	352,387	559	15.86
1 Philadelphia .....	1,200,000	2,500	20.83
1 San Francisco .....	320,000	580	18.12
2 Los Angeles .....	102,479	128	12.49
3 New York City.....	3,400,000	9,070	26.67
2 St. Paul .....	163,065	133	8.15
1 Minneapolis .....	190,000	225	11.84

1=Average for 10 years.

2=1900.

3=Average for 4 years.

State Census of 1900.	Population.	Deaths from Pneumonia.	Per 10,000.
California (outside San Francisco) ....	1,142,271	1,090	9.54
Georgia .....	2,216,331	2,598	11.72
Illinois (outside Chicago) .....	3,122,975	3,331	10.66
Louisiana (outside New Orleans) .....	1,094,521	1,252	11.38
Maryland (outside Baltimore) .....	600,093	946	15.76
Minnesota .....	1,751,394	1,379	7.87

**Bacteriology.**—The disease is undoubtedly caused by Sternberg's organism, the pneumococcus. As far back as 1880 he called attention to this organism which he had found in his own saliva. Experimentation led him to believe that it was the organism of specificity in pneumonia, and he published this fact in 1885. There is no doubt of his priority of discovery as to the organism itself and its actual and casual relation to pathology, and it is only fair that this honor be accorded him.

**Incubative Period.**—We have no way of as-

certaining or even guessing as to the incubative period in man. There is one point just here that is necessary to mention and which has been referred to before, viz.: There is often well pronounced prodromata, followed by chill and fever, and the most careful clinician is absolutely unable to detect the lung lesion by his ear, notwithstanding he may be on the *qui vive* for pneumonia from the very start. And "yet there must be a condition antecedent to these changes that constitutes the so-called 'first stage,' for which there is no anatomical indication." (Sturgis and Coupland, quoted by Smith.) Here is certainly a colony of pneumococci growing on a respiratory mucous membrane, in this instance well down deep in the air vesicle itself. So far as our senses are concerned it is an invisible colony, undergoing the first phase of its growth, its second phase being the rapidly developed colony causing an abundant outpouring of exudate which, overflowing like a fermenting vat from one vesicle to another, speedily infects the entire lobe. The lung is the only organ of the body which is favorable for the growth of this organism. It grows on the meninges and in joints, though the change in media causes considerable change in its pathology and its exudate. An interesting peculiarity is, that while the organism may grow and multiply in the blood, on the meninges and in joints, it will not cause pneumonia when injected under the skin or into the joints or meninges or into the blood. It seems to be necessary for it to be implanted directly on the lung mucous membrane, for while it is constantly present in the saliva and nasal mucus, it does not become pathogenic until it reaches the air vesicles, where it finds the proper medium. And another exceedingly queer thing is that while the organism multiplies on the upper respiratory tract as a saprophyte and causes no harm, it produces one of the most fatal of diseases if successfully planted in the air vesicle. Here we have an example of the wonderful effect the slightest change in the medium will make in the specificity of certain organisms.

**Chief Sources of Infection.**—It has been known for years that the common habitat and the only known habitat of the pneumococcus was the saliva and mucus of the upper respiratory tract. Sternberg discovered the organism in his own saliva and it is commonly present in the mouths of most persons. It is also found on the nasal and pharyngeal mucous membranes of many people.

There has been much speculation over the *modus operandi* of infection. It hardly seems reasonable that the organism reaches the lungs by extension. It lives solely as an obligatory saprophyte in animal mucus and, so far as we know, it is not facultative and will not grow in accidental media outside of the animal organism. It is therefore not a true saprophyte. It is more than likely that to be able for it to reach its destination of a field which furnishes the exact nutritive formula (the lungs) it must be ejected

from the body in saliva or sputum and be desiccated. Then when reintroduced and planted on the delicate membrane of the air vesicle, other conditions being favorable, it will grow and multiply and produce the characteristic lesions of the disease. The animal condition necessary to incubate the organism when planted is anything that will lower the vitality either temporarily or continually. A sudden accidental plunge into water, or getting drenched in a cold rain, or exposure to severe snow storms, excite the necessary cultural conditions for the growth of the organism, but, no organism, no pneumonia: that's certain!

It is a well-established clinical observation that the transitional stage from a nasal or bronchial catarrh is not an antecedent to pneumonia. The clinician is challenged to establish his first and preceding symptom as a "bad cold." The onset is more or less sudden with such well-marked clinical manifestations that it makes one feel that a bad cold had nothing whatsoever to do with it. It is acknowledged that chilling may bring about the necessary following of the soil so that, the organism being present, it will then grow, while under normal conditions the victim would have escaped, even though the cold was severe enough to frost-bite. We know that a pigeon which is refractory to certain infections will rapidly succumb if its resisting power is lowered, say by plunging it into ice water. There are many circumstances that one may relate to explain the lowered condition of man, such as getting drunk, severe and exhaustive labor, etc., but when we apply this line of investigation we must not lose sight of the fact that on close inspection of the conditions of overcrowding we find that the proportion of women infected is nearly as great as men.

The census figures show that in 1900, 58,340 men, and 47,631 women died of pneumonia, the difference hardly being great enough to apply the exposure theory as the sole factor.

It certainly is a disease incident to overcrowding, and cold or dampness have nothing to do with its spread, though dryness is a great factor. Baker never said a truer thing than that it was a disease of winter and of *dry* winters. Starr and others think that the cold causes a greater virulence of the organism, thus accounting for the greater frequency and severity of winter cases. Still, it is just as frequent in a given population of the South as in the North, though not so rapidly fatal. I think the more rational explanation is that in the severe winters the atmosphere, inside and outside, is much drier than at other times: and, the weather being severe, people tend to huddle more in theaters and places of amusement or in their homes. There is little or no ventilation for several weeks, and in the meantime the air of these places becomes more and more infected. The severity then of the disease in winter it would seem, is enhanced for the very simple reason that the numerical invasion is so

great that the lung is overwhelmed. Lower the standard of resistance then by a drunk, or lack of food, or by severe chilling and the factor of dosage will account for the severity and the number of these cases.

A careful study of the clinical histories of cases in large hospitals is convincing that the "cold" theory is untenable. It is a disease incident to overcrowding and caused much by man's own fault because it could nearly be wiped out by careful details of ventilation and disinfection. It kills as many people as tuberculosis and it is increasing rather than diminishing. It is certainly appalling to think of this stupendous death-rate; and it is more than discouraging to see that nothing is done to check, even in a measure, the spitting habit, which seems to be the only cause of its spread.

#### OBSERVATIONS ON AMERICAN CLIMATES AND LOCALITIES IN THE TREATMENT OF PULMONARY TUBERCULOSIS.

BY JAMES K. CROOK, A.M., M.D.,  
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THERE is reason to believe that the scourge of pulmonary tuberculosis will eventually be mastered by the science of man. Being a specific infectious disease, the nature and causes of which are adequately understood, it requires no great strain of the imagination to foresee a time, not many generations hence, when this most virulent enemy to human life will, to a great extent, be eliminated as an important factor in mortality statistics.

It is well known that the disease is preventable, and morbidity tables, in not a few localities, have already been perceptibly influenced by the sanitary measures put in operation, as a result of knowledge acquired within a few years. For a very considerable period yet to come, however, consumption will continue to rank as the most effectual weapon of the Grim Destroyer, and the ratio of about one in seven of those who are removed from earthly joys and sorrows by this cause will not be materially altered until we can bring entire batteries to bear where, as yet, only occasional random shots are heard.

If it became known that we are about to engage in a war with a great foreign enemy, which would probably result in the sacrifice of the lives of 100,000 of our fellow citizens, how quickly would our country spring to the call to arms. The great patriotic breast of America would thrill with heroic determination and resolve, and not a hamlet in our broad land that would not yield up its best and bravest in the national defense. Yet we are engaged in a perpetual war with an enemy far more deadly and implacable than any foe which may come against us with ships and soldiers and guns. At the current death-rate from pulmonary consumption more than 10,500,000 of the present population of the United States must succumb to that disease. The par-



amount importance of this subject is therefore apparent to all. We know the enemy. We are acquainted with his origin, with his methods and with his protean manifestations, and we are also fully cognizant of a well-tested and successful, yet withal expensive, means of operating against him.

The important question is, Do we possess sufficient humanity and love for our fellow creatures to employ our knowledge to the best advantage? Prevention is our chief reliance for the future, but let us here consider this problem: How can we best combat the progress of consumption after it has actually manifested its symptoms and signs in the patient's economy? It is the writer's absolute conviction that some form of climatic treatment, with its accessory circumstances, offers far more hope than all other methods of treatment combined. In an experience of more than twenty years the writer has not known of a single recovery from undoubted tuberculosis in which some change of climate did not constitute an important factor. The patient should, as speedily as possible, be removed from the locality in which the disease was inaugurated. The appearance of phthisis is in itself an evidence that there is something wrong about this particular atmosphere for the patient in question, and if he remain under the same environment he is almost sure to get worse. In the incipient stage the writer has observed some improvement in a removal merely into another street in the city limits of New York. Unquestionable good results have followed a transference of the patient's abode from points in South Brooklyn and lower Manhattan to Washington Heights, in the upper part of the city. The heights above Scarsdale, on the Harlem Road; the elevated ridges about Summit, Short Hills and Morristown, and other points in easy reach of New York have proved themselves of very great therapeutic value, not only in restoring lost tone and vigor in the feeble and anemic, but in not a few instances in arresting a plainly tuberculous tendency. At very convenient distances from the city environs will be found localities possessing atmospheric qualities quite at variance with those found on Manhattan Island.

Prior to April, 1901, when Dr. Legrand N. Denslow presented his paper on the climate of Long Island to the New York Academy of Medicine few medical men realized that within two or three hours' railway journey, in an easterly direction from New York, could be found an area possessing a climate from May to October almost identical with those to which, during the winter months, we send our patients on journeys of over 1,000 to 3,000 miles.

Let us for a moment pause to consider some of these atmospheric conditions as shown by Dr. Denslow's observations. The highest temperature observed at Long Beach in July, 1900, was 88; the lowest, 63, a range of only 25 degrees, or less than at any point in the United States for the corresponding period, except San Diego, Cal. The average relative humidity for August of the

same year was 60 per cent.; for September, 54 per cent. This was a much lower average than was observed at any point along the Atlantic coast, lower even than at San Diego or Los Angeles. The average relative humidity for New York City is 78 per cent. The three coolest points along the coast were found to be Nantucket, Block Island and Long Island.

Over a greater part of the State of New York the precipitation is heaviest during the summer months. The reason would appear to be true for Long Island, at least along the south shore and at the easterly end. W. A. Fleet, the United States Government observer at Cutchogue, states that at that point there are one hundred more clear days annually than at New York City, and one hundred and sixty-two more than at Rochester, N. Y. During June, July, August and September there were but eleven cloudy days, while for the corresponding months of 1900 there were only seven. Fogs are comparatively rare. No satisfactory theory has been advanced to explain the remarkable meteorological differences between this area and points on the mainland less than a degree of longitude distant, but these great advantages of dryness, equability and clearness, coupled with its proximity to large centers of population, would seem to mark the district as a promising refuge for certain varieties of bronchial and pulmonary troubles. Cases which progress favorably along our southern seaboard in the winter should certainly do well on Long Island during the summer months.

During the past summer the writer ventured to recommend the easterly and southerly part of Long Island tentatively to three persons having trouble with the respiratory organs. One was a case of chronic bronchitis with asthmatic paroxysms; the second was a case of incipient pulmonary tuberculosis, while the third patient was well advanced in the same disease. The results were as follows: The patient with bronchitis was markedly benefited, and there were only two or three slight asthmatic attacks during a sojourn of two months on the Island. The case of incipient tuberculosis was apparently arrested, there being a disappearance of the cough and physical signs; while the case of advanced phthisis appeared to jog along down hill at about the same rate it had shown in the city, the patient dying in December last.

Within a very short distance of New York City, in almost the opposite direction, will be found another favored locality, possessing a moderately elevated, cool and dry inland climate, quite distant from that last mentioned. The author refers to the Highlands of Southwestern New York. A small detached spur of the Alleghanies, of which the town of Liberty (2,300 feet in elevation), near the dividing line of the Delaware and Hudson watershed, may be taken as a representative point.

By reason of the establishment of the large and flourishing Loomis Sanatorium this region has become well known as a resort for tuberculous



cases. The writer will not dwell upon its advantages further than to say that this district offers a combination of desirable features difficult to excel. Patients do well in Sullivan County all the year round.

It is quite remarkable what a transformation has taken place in our views regarding the effects of cold on tuberculosis. Only a few years back we were in the habit of sending all our patients who could get away off to the South with the first appearance of cold weather, quite regardless of the type of the disease. Experience has slowly taught us that many patients fare better at our Northern resorts during the cold winter months than in the summer.

As many as four of the writer's patients are at this moment sojourning in Sullivan County, where the snow is thick on the ground and the temperature many degrees lower than in the city, and the diurnal variations of temperature more marked. The distance being comparatively short, the patients are able to make occasional visits to the city and can be kept under fairly close observation. All of these patients are doing well, and it is hoped that a permanent cure will result in each case. We have learned that a low temperature, especially if free from excessive humidity, is often much more inimical to the development and growth of the bacillus than it is to his intended victim. Nor does variability of heat or cold count for much, provided the atmosphere possesses the qualities of purity, dryness and brightness. There are many other favorable, though less well known, localities in the Shawangunk, as well as in the Catskill Mountains, which will no doubt occupy prominent positions among the health resorts of the near future.

What has been said regarding Sullivan County applies with equal or greater force to the Adirondack region in Northern New York, barring the single element of greater distance from the immense population in and around the metropolis. This fine region, embracing, as it does, about 10,000 square miles of territory, might afford sites for sanatoria, tents and camping grounds sufficient to accommodate all the tuberculous patients in our State and still leave unnumbered acres for private reservations, gentlemen's hunting preserves, etc. The winters are long and cold in the Adirondacks, from seven to ten feet of snow falling annually, but the right kind of cases may safely remain all the year. According to Dr. Trudeau, than whom we have no better authority, the best results are observed during the cold months.

It is not desirable in this place to attempt to detail the many advantages presented by this lovely and picturesque region. Suffice it to say that it offers a safe and hopeful retreat for many types of tuberculosis, and it will no doubt continue to grow in professional favor. Meteorological records at many points in the United States are still very meager, but even with our present incomplete and unsatisfactory knowledge it is apparent that within our limits are contained

the counterparts of all the most favorable climatic areas of Europe. In moist, marine climates; in warm, dry and desert climates; in moderate elevations, and in high and dry mountainous resorts it is easy to show that the conditions within our own limits are in nowise inferior to the best found in the Old World. Even in the single item of island climates, in which we have been somewhat deficient, there is a strong probability that we have lately become fully supplied. As practical experience accrues and climatic knowledge of our own country broadens, many innovations in professional practice must take place, and there will be a general rearrangement of our present ideas and methods.

Many fine, salubrious regions have never yet been utilized, while a few have been decidedly overworked. Almost every State in the Union which possesses a mountain district with plateaus of 1,500 feet elevations or over will be found to have localities suitable as resorts for tuberculous persons. Such districts exist in the White Mountains of New Hampshire, the Green Mountains of Vermont, the Blue Ridge in Pennsylvania and Virginia, and the main ranges of the Appalachian chain, extending south through the Carolinas and Tennessee. All of these States possess excellent examples of moderately high mountain climate.

In Florida and along the Pacific coast of Southern California are found the very best types of marine climates. El Paso, Texas, represents a region possessing a superb, elevated, warm, dry climate, while in Arizona we find the prototype of the much-vaunted Egyptian desert climate. The great plateaus of the Rocky Mountain chain present typical examples of the best Alpine Mountain climates which attract health-seekers from all parts of the globe.

Just a word about two or three of these localities. Florida peninsula has probably been more written about and more indiscriminately recommended as a resort for consumptives than any other State of the Union. Many tuberculous persons have been sent there, or gone on their own responsibility, who would have been very much better off at home. This unwise influx of hopeless cases has perceptibly influenced the mortality statistics and materially damaged the reputation of the peninsula as a health resort.

The writer is well aware, as the result of a recent tour of the State, that many persons still go there to the prejudice of their cases, while others render nugatory the benefits of the climatic conditions by entering too freely into the social gaieties at some of the new, fashionable resorts. It cannot be gainsaid, however, that the climate of Florida is just as salubrious and as beneficial as it ever was in the treatment of phthisis, *i.e.*, phthisis of the right kind. It is undeniable that several of the quiet and peaceful localities of the peninsula, including Rock Ledge, Osmond and Daytona on the east coast, Winter Park and Kissimmee in the interior, and Tampa and Belleair on the Gulf, offer as favorable conditions for the residence of the properly selected

phthisical cases during the winter months as are to be found on the globe.

Colorado offers exceptional attractions as a resort for weak-lunged persons or for those who are in the early stages of tuberculosis. Persons may safely remain in the State all the year, and there are opportunities for remunerative employment in the flourishing plateau towns which do not exist in any similar locality in the world. Many of the opulent citizens of Denver at the present day went to the State years ago victims of tuberculosis. They live as speaking testimonials of what the Colorado climate is capable of doing. Yet the author knows of many bitter disappointments.

A physician, himself at one time afflicted with early tuberculosis, stated a few weeks since that another month in Colorado would have killed him. He had just sufficient strength left to make the journey to Los Angeles, where he speedily recovered. It should be borne in mind that there is something very positive about the bracing, stimulating mountain air found at the high elevations of the Colorado resorts. Weak, delicate and nervous persons should feel their way very carefully in going there, and in many cases it is better to pause at some intermediate point of less altitude before risking the higher elevations. (This subject will be referred to later.)

This brings us to the consideration of a most vital question in connection with the climatic treatment of tuberculosis. Does experience or reason supply us with any indications whereby we may with a fair chance of success direct a particular patient to the locality where he will be most benefited, *i.e.*, where the atmospheric conditions are most suitable for his case. Much remains to be learned in this direction. The empirical method is still largely relied upon, but we have come in possession of certain rational guide-marks, which should always be taken into consideration in deciding the momentous question as to whether the patient should leave home, and when and where he should go.

In the very beginning of the treatment it is highly important to act promptly. As soon as the disease is identified the patient's environment should be changed, unless there are special reasons which forbid this step. The fact that the bacillus has gained a foothold shows a correlation between the environments of that particular locality and the patient's system favorable to continued bacillary growth and development. The disease is almost sure to progress. But in sending a patient away from home it is not wise to rely blindly upon the climate alone. This should not by any means be regarded as a specific for phthisis, but only as one of our most highly valued aids. Perhaps the patient will not require so much in the way of drug treatment as at his home in the city. Yet the much-prized and highly useful tonic preparations employed in this disease should not be recklessly cast aside. Besides, many of the symptomatic indications, no matter where the patient may go, will continue to require occa-

sional drug treatment. Cases with much fever or other constitutional disturbance should always be treated temporarily at home before sending away.

With reference to where the patient should go, a consideration of the following points is useful:

(1) Ordinary cases in the early stage, with slight lung involvement and little constitutional disturbance, usually show improvement with almost any change of climate. Such cases frequently recover at Liberty, in the Adirondacks, in Florida, Southern California, or Colorado.

(2) In catarrhal cases attended by profuse secretion, a dry climate should be chosen, preferably a warm, dry climate with as little wind as possible. Atmospheric conditions in Arizona and in the neighborhood of El Paso, Texas, barring the occasional Northerners at the latter place, are very favorable for this class. Nearer home, Thomasville and Summerville in Georgia, and Aiken, South Carolina, are beneficial. Many catarrhal cases do well in Colorado and New Mexico. These patients usually fare badly in moist climates.

(3) Persons of the nervous, irritable and erethistic temperament do better in a marine climate, and should not be sent to high elevations. During the winter Florida or Southern California may be chosen for the winter months, Old Point Comfort or Atlantic City for the spring, and, perhaps, the South Shore and easterly end of Long Island for the summer.

(4) Sir Hermann Weber advises against sending cases of ulcerative tuberculous laryngitis to high elevations. It would appear that in Colorado not over 25 per cent. of such cases receive benefit. We are informed, however, that 70 per cent. of cases of this type show improvement at the Loomis Sanatorium, at an elevation of 2,300 feet. The writer has seen excellent results in both Florida and Southern California.

(5) Most chronic slowly progressing cases, especially fibrous phthisis, do best in a marine climate. Such persons living in the East do well to spend the winter months in Florida, coming North by easy stages as the spring advances. Even in New York City and vicinity patients of this class often enjoy long periods of immunity from any particular symptoms. One woman under the writer's care, suffering from fibrous phthisis, passed the last twenty-five years of her life in comparative comfort between Orange, N. J., and Manhattan Island.

(6) Cases of phthisis complicated by heart disease should be kept at comparatively low levels. Persons with enfeebled circulation who suffer from cold hands and feet and who shiver in slight draughts should also keep away from high altitudes.

(7) Cases involving much loss of lung substance, or the withdrawal of any considerable portion of the respiratory area from the exercise of its functions, whether from compression of the lung due to empyema, or simple pleurisy to excavation, to retraction from old pleurisies or to emphysema, usually fare badly at high eleva-



tions. Such cases are not susceptible of permanent cure, but their condition is considerably ameliorated by a winter residence in Florida or along the Southern California littoral. Theoretically the low-lying desert belt of Arizona should furnish an ideal climate for such patients, but experience with this region is, so far, too meager to supply us with reliable data.

(8) Puny youths, with transparent skins, spindle legs and ill-formed chests, not actual but potential or probable cases of tuberculosis are generally benefited by a prolonged residence in a high mountain region.

(9) There has been considerable difference of opinion in reference to a proper climate for hemorrhagic cases. The first patient ever referred by the writer to Colorado was seized with his initial pulmonary hemorrhage on the day of his arrival in Denver and suffered daily from this cause during a three weeks' stay, when he returned East. Not a few subsequent hemorrhagic cases have thriven remarkably well at some of the high Colorado and New Mexican resorts. The most careful observers are apparently beginning to agree that the occurrence of hemorrhages is no bar to high altitudes. Dr. S. G. Bonney, of Denver, in a recent communication, embracing a very large experience in Colorado, presents indubitable evidence to show that this elevated region is not prejudicial to hemorrhagic cases. It would appear, with our present knowledge, that the tendency to pulmonary hemorrhages does not in itself furnish an indication either for or against any particular variety of climate.

(10) It is urged by some writers that cases of phthisis accompanied by albuminuria or marked diabetes should be kept away from high climates. The writer, however, has been unable to find any satisfactory evidence in support of these views. Cases so complicated are usually of great severity and apt to be progressive. It would, therefore, appear to be unwise as a rule to send persons having these troubles far from home in any direction.

Let us now consider a final and very practical aspect of this question. We have a variety of the best climates in easy reach. The patient with means and time at his disposal may have the advantage of any kind of atmospheric environment his medical adviser chooses for him. But how about that vast majority who are engaged in the struggle for their daily bread and too often have helpless families depending upon them and who must remain at their work as long as they can drag one foot after the other?

It is not intended here to decry the magnificent benefactions of our wealthy philanthropists to universities, colleges, museums of art, etc. These are grand and able works and worthy of all praise and emulation, but they will be of little use to the thousands all over our fair land, over whom hovers the grim specter of tuberculosis, or who have already entered upon the death struggle with the fell destroyer.

If such a person could at once suspend his occupation and be sent without delay to a properly selected locality in the country, on the seashore or inland, as the conditions may require, where he could for the time be free from the worry and care of toiling for his living, where good food and lodging may be had, and where skilful medical attendance and nursing are supplied, and where the patient ceases to be a menace to his associates and the community, a long step toward the extermination of this scourge would be accomplished. It is the author's conviction that the rich man who establishes and endows one such sanatorium, where his suffering and dying fellow-creatures may be won back to health, hope, and usefulness, is worthy of greater love and honor from his countrymen and will occupy a higher place in the final accounting than he who embellishes a costly church, builds a library or founds a university.

Some of our French contemporaries have recently been passing the time by calculating the cost of providing suitable sanatoria for the half million consumptives in France. They have succeeded in staggering themselves out of all hope in the feasibility of sanatorium treatment. It is therefore recommended that we concentrate all our energies on prevention alone, which is practically an abandonment of the poor devil who already has consumption to his fate.

Thank God that this advice proceeds from France and not from America. It has not been a habit of our countrymen to quail at undertakings because they are difficult or expensive. If we can fully convince our law-makers, as well as our millionaires, of the necessity for tuberculosis hospitals the means for their construction will be forthcoming.

783 Madison Avenue.

## MEDICAL PROGRESS.

### SURGERY.

**Etiology of Coxa Vara.**—Since Kocher and Hofmeister called the attention of the profession to this condition many years ago, the literature touching on it has developed to a very great degree. Dr. M. HAEDEKE (*Deut. Zeitsch. f. Chir.*, Nov., 1902) presents his own as well as some of the later views on the etiology of this condition, and cites a most interesting case which is well illustrated by a radiograph. In the face of the positive findings which present themselves in every case of infantile coxa vara, no one can deny the importance of rickets as an etiological factor in this condition. In the absence of any practical points in the etiology of the condition in the young adult one is obliged theoretically, at any rate, to accept the presence of some acute bone softening process. Although in the bulk of all cases this condition may be justly considered one kin to osteomalacia, yet there are a certain number of cases, the author's among them, which point strongly to a true late rachitic process, yet this is not easy to understand. His case was that of a seventeen-year-old boy from the country, who had always worked on a farm. He had always been well so far as could be learned. A few months before the observations were made he began to have a slight pain in the right hip which was particularly marked after sitting. Shortly after this he began



to limp and accordingly was put to bed for eight days. This, however, did little good, and the patient soon after noticed that the right leg was becoming shorter. Three months later while attempting to lift a heavy weight he felt a severe pain and was obliged from that time on to quit work. Physical examination showed his right trochanter was two inches above Nelaton's line. Passive motion was limited, particularly in abduction. The limp was very marked. The radiograph shows the cause of the limitations very clearly to be a typical and far-advanced coxa vara. Under simple extension treatment there was no improvement, so that after about a month the typical Langenbeck excision was done. Seven months later the patient was able to go about without pain and the position of the leg was good although the limp remained. The examination of the resected neck showed an angle of about 100 degrees. The convexity was forward while the head itself was turned markedly to the rear, a very marked axial rotation seeming to have taken place. The cartilage of the head was well preserved and smooth. The epiphyseal line did not show marked distortion, but in portions of its course could be seen dark red particles of young bone which represent small islands left behind from the diaphysis. Microscopical examination of this area showed changes which seemed characteristic of infantile rickets so clearly that no one could doubt it, the only possible point in question being the etiological importance of the change. It is but fair to say that in this case the well-known history of trauma was not wanting, but it was not given by the patient because there seemed to him no connection between his fall and his sickness until special inquiry into this point was made. Statisticians are beginning to agree, however, that if trauma have any influence in causing coxa vara, it is of the very slightest import. There is something much more far reaching, something probably as yet unrecognized and certainly not understood which causes this deformity. Nor does it seem possible, when we consider the relative infrequency of osteomalacia, when we think of the gravity of its symptoms, of its rarity in men, that so limited an area of bone could be involved in so general a process. On the other hand, as in the case cited, although the microscopic anatomy of the part cannot well be differentiated from rickets, how many cases of adolescent rickets exist in which this deformity is absent. In searching for the ultimate etiological factor, one is thrown back to Kocher's juvenile osteomalacia or better, to some other unknown malacia to account for this rare but serious disease.

**Difficulties in Diagnosis Between Hepatic Calculi and Renal Calculi.**—The following very valuable observations on these conditions are offered by C. E. BARNETT (Ann. of Surg., Jan., 1903). As to similarity of symptoms, he says that pain from either hepatic or renal calculi might be referred to almost any point, and would be merely a subjective sign of disturbance in that region. The X-ray in differential diagnosis is not so valuable in this region as elsewhere in the body, and unless stereoscopic skiagraphy can be perfected, sufficient to measure depth, there will always be a question in the mind of the operator. To illustrate this point the author has had two radiographs taken, both from living subjects,—one a renal stone, the other a hepatic calculi. Both shadows are directly opposite lumbar vertebra and both shadows show in front of the right transverse process. In a female subject in which he had passed malleable wire wounds into the ductus communis choledochus, pancreatic duct, and the ureter, the radiograph shows the ends of the sounds directly opposite the second lumbar vertebra, leaving a space as large as a half dollar, which would correspond to the kidney pelvis. Behind this body, in order to test the density of the shadow in

the different kinds of renal calculi, four different artificial renal stones were placed. The first was composed of calcium oxalate (which shows the dimmest); the second, uric acid; the third, triple phosphates (those two show about equal in density of shadow); the fourth was composed of all three combined, its shadow coming second in density. In another cadaver, also a female, mercury was injected into the gall-bladder after ligating the terminal ducts, and a wire was passed from the urinary bladder, up the ureter into the upper quadrant of the kidney pelvis. The radiograph shows the gall-bladder, from the weight of the mercury, hanging down below, and to the right of the second lumbar vertebra. The sound is above and internal to the gall-bladder shadow. This demonstrates two especial facts—a possible anomalous position of the gall-bladder when weighted down with stones, and the near relation of cystic duct, in this subject at least, with the upper portion of the pelvis of the kidney.

#### **Diagnosis and Treatment of Septic Synovitis.**—

There is still a marked tendency on the part of the profession to treat inflammatory conditions of the joints, particularly in cases of single involvement, in a perfunctory manner under the general term rheumatism. F. C. WALLIS (Brit. Med. Jour., Jan. 3, 1903) declares that if more attention were given to the diagnosis of the isolated joint cases there would be less disturbance of a chronic nature as a sequel and better success on the part of the practitioner in relieving the immediate symptoms. He calls attention to the fact that in rheumatic fever there is notable a profuse sweating which has its characteristic signs and odor; the condition of the skin, harsh, dry and unpleasant; and the unhappy mental condition, as important guides in differential diagnosis. He cites a most interesting case in which monosynovitis was of frequent and inexplicable occurrence in which the patient was suffering from septic ulceration of the rectum. When the ulcers were healed, the synovitis vanished. Usually this type of synovitis, of which the author has not been able to determine the specific microbe, clears up and leaves the joint in normal condition. There is another form of synovitis which is frequently mistaken for rheumatism, viz., gonorrheal. It differs from the last named in that the onset is not painful, is slow, persistent, will not yield to ordinary treatment and is accompanied by the evidences of gonorrheal infection elsewhere. It is of importance that the nature of the infection should be known at as early a date as may be in order that the joint may be treated surgically, the infection and its products removed, first, because these cases are essentially chronic under any other form of treatment, and second, because a large proportion of them, unless treated radically, end in permanent disability. All known drugs have been used, every form of splint, countless types of irritants; all have been useless in mitigating this dread complication. It is worth remembering that with a simple incision; with mild antiseptic irrigation, with closure of the incision, with rest from ten to fourteen days and with gradual active, and passive movements and massage, these joints will be normal again in less than a month. It is noteworthy that the gonococcus is to be found only in the early stages of the trouble, viz., at the very period when the joint is in most cases thought to be rheumatic. Hence, when aspirated and the turbid exudate examined microscopically the germ is generally found wanting. This does not disprove the presence of gonorrheal infection and it is supposed that the continued synovitis arthritis which may persist a year after the original infection has vanished, is due to the virulent toxins which originally produced by the germ, are for some unknown reason not absorbed but remain in situ until washed out by the surgeon.

**Diagnostic Value of Abdominal Rigidity.**—The value of a sign or symptom in abdominal cases largely depends upon the period of incidence. For instance, the diagnosis of a well-defined peritonitis is so evident that no single one of the various symptoms is of especial value. On the other hand, any sign that may mark the beginning or diffusion of a peritonitis is the presence of foreign matter in the peritoneal cavity is of the greatest value. J. A. BLAKE (N. Y. Med. Jour., Jan. 3, 1903) emphasizes the value of rigidity as an early diagnostic point and believes that pain and rigidity go hand in hand as the cardinal subjective and objective signs of commencing as well as advancing abdominal trouble. Rigidity is the reflex spasmodic contraction of the muscles of the abdominal wall exerted, not only to protect the irritant peritoneum from influences acting from without the body but also to restrain the movements of the viscera and thus produce rest. It is an active constantly acting spasm of the muscle not necessarily accompanied with swelling or tenderness. Its degree and extent are valuable as evidencing a corresponding degree and extent of abdominal trouble. When slight it may be confounded with the voluntary contraction of muscles to protect a tender viscus and hence the manner of eliciting rigidity is important. Gentle pressure with the flat of the hand, thus gaining the confidence and diverting the attention of the patient, will give much more valuable information than strong deep pressure.

Rigidity is caused not only by inflammation, but also by irritation of the peritoneum and therefore a hemorrhage will cause rigidity even when there is no evidence of inflammation. The pressure of urine or stomach and bowel contents will also produce early rigidity. Numerous cases are cited to prove the above points and show how valuable the sign is as an indication for operation. In typhoid fever the absence of rigidity even when all the other symptoms of perforation are present makes operation of doubtful utility. In thoracic inflammations with the involvement of the diaphragm there is frequently some rigidity of the upper segment of the abdominal wall which may be confusing. On account of the internal support which the muscles obtain at this point slight degrees of rigidity are difficult to appreciate and it is perhaps best to delay operation unless other conditions indicate it, till rigidity has involved the muscle down to or below the navel. It is believed, furthermore, that abdominal rigidity is always present in peritoneal irritation or inflammation, except in the advanced and chronic cases of tuberculous peritonitis where it may be absent.

**Operation Without Direct Application of the Fingers.**—The perfect sterilization of the surgeon's hands has remained to this day an unsatisfied ideal of aseptic surgery. Unfortunately the use of high degrees of temperature, which can be employed for the sterilization of instruments and dressings, cannot be applied here, where cleanliness is most difficult to achieve. But those who use plenty of warm water, and the warmer the better, during the act of scrubbing the fingers and finger-nails, are the most successful in hand-sterilization. The subsequent use of alcohol, corrosive sublimate and other chemical disinfectants is less important than the preliminary mechanical cleansing of the hands, in the opinion of Prof. KÖNIG (Berl. klin. Woch., Jan. 5, 1903). However, not even the most conscientious preparation of the hands will guarantee absolute sterility. The greater the duration of an operation, and the more active the employment of the fingers, the greater the danger of wound-infection. König asks whether the direct application of the fingers cannot be dispensed with. Anybody who is familiar with the complexity and difficulty of intra-abdominal operative procedures will

at once reply in the negative. König, however, undertook to ascertain how far the proposed method of operating could be carried. Beginning with operations on joints, he extended his experiments at first to operations on bones, then to superficial tumors, cranial operations, and finally he undertook to perform the simple operations on the vermiform appendix without the direct application of the fingers. In one year 600 cases out of a total of 1,000 in König's clinic, were treated in this manner, a large proportion being bone and joint cases. König declares unequivocally that the majority of the simple operative procedures undertaken by the general practitioner can be carried out according to his proposed method. A modification of the length of handles of instruments is necessary, and the operator and his assistants must be thoroughly drilled in the new technic. König describes in detail his method of procedure in osteotomy.

**Nephrotomy for Anuria.**—Some interesting points concerning anuria are brought out by F. BOMMARITO (Gaz. Sicil. Med. e Chir., Jan. 15, 1903) in the case-histories of two patients in whom anuria persisted four and twelve days respectively without uremic symptoms and in whom operation revealed the presence of calculi in the pelvis and body of the renal tissue. From the facts that the size and location of the calculi and absence of dilation of the ureters and pelvis, as well as absence of hydronephrosis preclude the possibility of anuria depending upon mechanical occlusion, the author holds that reflex or spasmodic inhibition of secretion was responsible for the trouble. This theory seems to be borne out by the entire absence of urine in the pelvis at the time of operation, and by the prompt resumption of the normal function in the right kidney of the second case after removal of the calculus from the body of the left; the reestablished urinary secretion of the latter being carried off through a drain in the external wound. Bommarito finds that absolute anuria almost invariably occurs in subjects who have long suffered from renal lithiasis; this inducing either mechanical or reflex anuria; and in all such cases nephritis is present to some extent in both kidneys. He, therefore, concludes that operation should not be deferred till symptoms of intoxication appear, but should be done promptly before the damage to the renal tissue, which follows in the train of such anuria, progresses too far.

**Incontinence of Urine.**—The vexatious condition of patients suffering from incontinence of urine and the general obstinacy of the condition render new suggestions as to treatment attractive. Injection of air into the cellular planes is suggested by BÉRAUD (La Sem. Méd., Jan. 21, 1903), who had occasion to observe a young woman, eighteen years old, suffering from nocturnal incontinence, which resisted compromise and the customary division of the meatus with the removal of polypi, and also careful antiseptic of the vulva, vagina and urethra. He then tried epidural injections of artificial serum, as suggested by Albarran and Cathelin, which temporarily succeeded for several days. Encouraged by this result, he followed the suggestion of Jaboulay, namely, of affecting the sacral complex and the hypogastric complex, just in front of the vertebral column, by bringing about a true lessening of the cellular tissue by the injection of sterile air. He carried out the injection in the rectococcygian raphe, aided by a finger in the rectum as guide, to prevent penetration of that viscus. About 150 cubic centimeters were thus injected in the perirectal space, causing the patient a feeling of distention, then of colicky pain. The air seems to have mounted upward in front of the spinal column, up to the level of the clavicles, for there were several cardiopulmonary manifestations, but after a quarter of an hour, all these symptoms disappeared.



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Subscription Price, including postage in U. S. and Canada.

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SATURDAY, MARCH 21, 1903.

## VACCINATION IN EARLY CHILDHOOD.

FOR several years past, about this season of the year, we have had a maximum in the curve of smallpox frequency throughout this country. The present year is no exception, and the reports of the Surgeon-general of the marine hospital service show that while we have not as much smallpox as for several years, and only about one-half as much as last year, there is enough of the disease in the country to justify the expression that smallpox is epidemic. New York has been spared almost entirely during the present winter, thanks to the effective work of our Board of Health last year, but some of the other cities of the country have suffered severely. Smallpox has not become endemic in this country, but it is very evident that the disease will not be eradicated unless the most careful precautions are taken to guard against its further distribution.

There remains among a large number of the intelligent classes of our population a serious prejudice against vaccination. This does not manifest itself as a rule by open opposition to the legal enforcement of vaccination, but it keeps most people from having their children vaccinated until they come of school age, when the municipal school regulations require it.

There is no longer any good ground for people

to argue against the benefits conferred by vaccination. Some of the recent statistics are very striking. In London, for instance, during the last ten years of the nineteenth century, 125 persons who had at some time during their lives been vaccinated took smallpox. Some of the vaccinations had been performed as long as twenty years before the occurrence of an attack of smallpox. In some the scar that remained was so small as to make it very clear that the vaccination had taken but very slightly, yet not a single one of these individuals died. On the other hand, 672 individuals who had never been vaccinated contracted smallpox and among these there were 153 victims of the disease.

In Germany, where vaccination regulations are stringent and are carefully carried out, the deaths from smallpox are so few as to amount to practically nothing in the mortality records. Most of the cases of smallpox seen in Germany occur among visitors to the country, and it is noteworthy how many of them occur among those who, having perhaps been born in Germany, have been away from the country during their childhood and youth and have returned as adults, when they are beyond the enforcement of vaccination regulations. The comparison between the amount of smallpox in the German army and that in the French army during thirty-five years, or since the Franco-German war, is too well known to need repetition here except for the statement that while the French army has had tens of thousands of cases of smallpox, the disease in the German army has placed a few hundred on the sick list, and while there have been no epidemics among the German soldiers there have been several very serious epidemics in French barracks and encampments.

In recent years there has not been any difficulty in securing nurses for smallpox patients, or physicians to attend them, and such attendants have not been recruited exclusively, as before, from the ranks of those who had smallpox. It is well understood now that vaccination repeated until it ceases to take, furnishes a complete protection against smallpox and none of the nurses, or medical attendants who have faithfully taken this precaution have suffered from the disease. Considering the well-known contagiousness of smallpox this is the best possible proof that vaccination is absolutely protective. There is no reason then why such protection should be delayed until the age of six years. Those who have been vaccinated once successfully, always suffer less inconvenience



from subsequent vaccinations, so that the sooner children are brought under the influence of the vaccine virus the better.

The Chicago Board of Health pointed out recently that a number of cases of smallpox had occurred among small children as yet unprotected by vaccination in the crowded districts of the city. The chief medical inspector, Dr. Spalding, says in a recent report: "If parents could see, as I am sometimes compelled to see, sorrowful mothers walking the floor with festering children in their arms, crying and reproaching themselves for neglecting to have their little ones vaccinated, there would be no need of urging the vaccination of babies. A vaccinated child never was known to have smallpox. If people could go to the hospital and see for themselves that this statement is true they would not wait until the vaccination law compelled them to have their children vaccinated at the school age of six years. They certainly would protect their children from smallpox at the earliest favorable moment."

Children under the school age constitute at the present time practically the only class in the community who are in large numbers left unprotected by vaccination. This is an undesirable state of affairs and one that the influence of the family physician should be brought to bear upon, for in him lies the remedy for it. It creates a distinct danger not only for the family, but because it allows fuel for smallpox infection to remain, to no small extent, in communities is also a public danger.

The successful efforts of boards of health in many cities in very recent years seem to indicate that the absolute eradication of smallpox is only a question of the enforcement of existing sanitary regulations. No more desirable consummation is devoutly to be wished than the disappearance of smallpox. In the question of infant vaccination every one must see that one of the most important elements of the problem now left for solution is involved.

#### FAMILIES OF COLLEGE GRADUATES.

THE discussion aroused by President Eliot's announcement that the Harvard graduates of twenty-five years ago have failed to produce their proper share of the next generation has called forth a similar and a corroborating statement by Prof. Thorndyke of Columbia College. He gathers statistics from a New England college attended by country-born and country-bred sons

of parents of small incomes, with the conclusion that the fertility of graduates of this college of a generation ago is between 2 and 2.4. Moreover he says that the college graduate of 1800 through to 1809 produced a family on the average two and a half times as large as his successor two generations later between '70 and '75. The humorists or the pessimists, continuing in imagination this ratio of decrease, might prophesy during the present century a sterile species of mankind, and the college graduate, although the flower of the race, would be like the wonderful product of the florist's care, a single infertile blossom.

Professor Thorndyke feels that the general discussions lead to the conclusion that incapacity may have been the sole cause and probably is the cause of three-fourths of the loss, and that restriction as commonly conceived cannot have been the sole cause. "The racial suicide of the college-bred class seems not to be a social crime—or virtue, if you please—but a disease. Its cure will not be found in moralizing, but in the physical improvement of the mentally superior strain."

If it be a disease then it is the physician's province to discuss it. The pathologic theory is in accord with the general eager spirit of the age to spot the microbe and to discover a serum. But we fear that in the chase of the bacillus and the lust for serum therapy, there is a little too much eagerness to find specifics for every separate organ of the body, and too little attention paid to the body as a whole.

If one is going to treat the case of the individual college graduate, he must suit the remedies to a particular diagnosis; if he is going to prophesy the future of the race he must heed certain general racial laws. In other words, why do we concern ourselves with the fact that the Harvard graduate bears 1.8 children and the New England graduate 2.4? Do we wish to find the microbe of modernity that poisons paternity and inject a moral serum into the veins of youth that will insure the whilom prolific increase of his ancestors, or are we concerned lest the flowers of our race shall cease to bloom because they do not turn to seed?

Let us discuss the individual first. It is an undeniable fact that the American citizen who uses his brains to earn his livelihood does not have as many children as did his colonial progenitors who lived on their farms or who worked with their hands. We think that if the complicated data could be untwisted we would find that college education has nothing to do with the case,

that the average business man who enters into the keen competition of modern city life has almost as few children.

There are many factors to be taken into consideration. They are the increasing cost of living, the enlarged scale of living which makes many young men hesitate to marry, the ease with which their passions may be satisfied without the marriage bonds, the diseases that, when contracted, render them sterile, the ambitions and strenuous work that fill their minds to the exclusion of the desire for family life; the decided distaste among many women who have entered into business or social life to bear and care for children. But the greatest common factor is probably the foresight of the prudent man who sacrifices the present to the future. Competition is too great for all men to succeed in professional or business life if they are hampered by the expense and care of many children, consequently they and their equally prudent wives apply their educated minds to the elimination of the possibilities of bearing them.

Zola opens his great novel *Fécondité* with a modern conversation, in which the young husbands and wives who are intimately acquainted discuss the question politely. One couple thinks children would mar their perfect love of each other, another wants to give undivided care to an only child who is not strong, another father and mother so love their one daughter that they will deny themselves the joy of having more for the sake of giving her all that money and education can bring. The hero of the novel and the ultimate father of twelve children, who eventually bear him over a hundred grandchildren, goes to his poor country house, abashed by his own indiscretions in the matter of paternity, as viewed in the light of the wisdom and prudence of his comrades. The development of the story reveals every form of infidelity, of perversion, of matrimonial infelicity and malpractice. The moral is that true happiness lies in bearing and rearing a large family.

The educated American who has only a small family can read his own moral in his individual case; but no one cause, whether innocent or evil may be attributed to any particular class of Americans, especially to such a varied and artificially grouped class as that of college graduates. If we attribute the cause to a "disease," we can only call it the "disease of modernity," which we fancy is as old as Pericles.

And this brings us to the philosophical view of the race. Malthus and President Roosevelt

would, we fear, shake their heads out of tune in their ominous view of the future. There has, doubtless, never been a time when the overproduction of the masses did not threaten to overwhelm the classes, and when the philosophers did not grieve that those who were most competent to lead the race were not the foremost to reproduce their own kind. And yet, in spite of ominous predictions, society has risen to successive heights of civilization.

The law that governs the rise of nations is like the law of convection currents. As new molecules are constantly carried up to the energized point of steam, so are the ranks of climbers in the world of men continually rising to positions of power. Those who have reached the top do more than merely reproduce their kind. They transmit their energy, and it is thus that they truly reproduce themselves.

What though college graduates do not replace themselves in their universities by their own sons! They have filled their places a hundred times by their influence, their teaching and their vitalized energy.

#### NEED OF INTEREST IN MEDICAL HISTORY.

We called attention in a recent issue of the *MEDICAL NEWS* (editorial February 21, 1903) to the movement for the exploitation of the sources of medical history here in America, which is just becoming a prominent feature of our medical literature. That there is distinct need for such a worthy movement, if important historical data—material and documents—are not to be permitted to be irreparably lost, is not hard to make clear. In looking up the details of the life of Dr. John Stearns, a short sketch of which appears in the present issue of the *MEDICAL NEWS*, we found the sources of available information extremely meager, and portraits of Dr. Stearns so rare that it was impossible to obtain a copy of one for illustration purposes for this issue. Now, Dr. Stearns was the first president of the New York Academy of Medicine and one of the prime movers in the organization of The Medical Society of the State of New York, one of the few medical organizations of the early days that has maintained its identity down to the present time.

Dr. Stearns was above all a medical organizer. To him we owe one of the first regular medical societies, that of Saratoga County, and he was one of the men who in the Medical Society of the State of New York elaborated the idea of a na-

tional organization of medical men and became thus the actual founder of the present American Medical Association. It is too bad to think then that the example of his life may fail to have the effect that it should have because the details of it will be lacking to future generations. The Medical Society of the State of New York is about to begin its preparations for the celebration of its centenary in 1906. The committee appointed for the initiation of preparations for that event can do no better service to medicine and to the medical profession of this country than to gather together all the available information with regard to these men who spent their time and labor in securing the organization of the medical men of the United States.

## ECHOES AND NEWS.

### NEW YORK.

**New Beds at the Ruptured and Crippled.**—The Hospital of the Ruptured and Crippled has established twenty new beds for the use of adult females.

**Appointment of Dr. Noyes.**—Dr. W. B. Noyes has been appointed consulting neurologist to the Mountain-side Hospital in Montclair, N. J.

**Tarrytown State Hospital.**—Dr. H. A. Gates, of Delhi, N. Y.; Dr. Grant C. Madill, of Ogdensburg, N. Y., and Dr. Frank Walker Sears, of Binghamton, N. Y., have been appointed as consulting surgeons to the New York State Hospital for the Care of Crippled and Deformed Children, at Tarrytown, N. Y.

**Fight Against Tuberculosis.**—The committee on the prevention of tuberculosis of the Charity Organization Society have issued the following pamphlet bearing on the fight with tuberculosis:

**Why Fight It?** BECAUSE more people die of consumption than from any other disease.

Each year 1,095,000 of the people of the world die of it. In the United States over 100,000 die every year of consumption. Every day 3,000, and each minute of the day 2 persons fall before this enemy.

How many of your friends have died of it?

BECAUSE it is a disease which spreads from one person to another, and any one may catch it.

BECAUSE it is chiefly caused by the filthy habit of spitting.

BECAUSE it is a disease which can be stopped, and need not spread.

BECAUSE every one may and should help stop it.

BECAUSE already there is change for the better. The number of deaths from consumption is growing less. Twenty years ago there were many more deaths in proportion to the population than now.

If the tuberculosis death rate of 1886 had been maintained the first nine months of 1902, 4,000 more persons in Manhattan and the Bronx would have died of tuberculosis than actually died in these months.

Could anything be found more inspiring, more plainly indicative of the need for extending the work against this disease?

**How Fight It?**—BY REMEMBERING THESE FIVE POINTS ABOUT THE ENEMY.

I. People are seldom born with consumption.

II. It is caused by a very small living thing whose name is *Bacillus tuberculosis*.

III. This living thing comes from the sick person through the spit. Sometimes millions are coughed up and spit out in a single day by one consumptive person.

IV. This spit may dry, and the germs mix with the dust and float in the air, settle on the walls or in the carpets.

V. They are then breathed in and settle in the throat and lungs, causing consumption of those parts.

**How Fight It?**—BY REMEMBERING THESE FIVE POINTS ABOUT THE BODY.

I. Your body can resist these germs, so that they will not spread and cause consumption.

II. If your body is weak it may not be able to resist them.

III. Your body may become weakened. How? By strong drink, which is one of the best helpers the germs have. By other forms of dissipation. By too little food, air and light. By the grip, typhoid fever, pneumonia, bronchitis and sometimes a simple cold.

IV. Keep your body strong so that you can resist the germs. How? Be in the open air as much as possible. Drink plenty of pure water. Keep early hours. Sleep eight hours out of the twenty-four. Live as regular a life as possible; eat plain, good food; see that the bowels move freely every day. Consult a doctor if you have a cough, or are run down, or if you cannot stand as much work as you could formerly.

V. Do not spit yourself or allow your consumptive friends to spit on the floor, carpet, stove, wall or street, or anywhere except in a cup or spittoon for that purpose. This cup should contain water so that the matter will not dry. When not at home, or in a place where a spittoon cannot be used carry little pieces of tissue paper, and after use burn them.

**Tell your friends** that consumption is one of the oftenest cured of all chronic diseases, and can be cured in nearly all cases, but it must be taken very early.

**Are You Interested?** If you wish to read more on this important matter, write to the Charity Organization Society, 105 East Twenty-second Street, New York, for information.

**Gift to Long Island College Hospital.**—It has been announced that Long Island College Hospital is to have a new structure, replacing the present building occupied by it. This will be done through the generosity of J. Rogers Maxwell, who has offered to build at his own expense the two central sections of the proposed structure as a memorial to his brother, Henry W. Maxwell, who for many years was a member of the Board of Regents of the hospital, and who, at the time of his death, was engaged on a plan for its reconstruction. Mr. Maxwell's offer was set forth in a letter to the Board of Regents, in which he says: "It is my desire to erect a memorial to my late brother, Henry W. Maxwell, and it is fitting that this memorial should be a fulfilment of his desire to obtain new buildings and an equipment for the Long Island College Hospital. I therefore offer to the Board of Regents to construct and equip the two central buildings shown on the accompanying perspective drawing and plans, upon the premises now owned by the institution. Upon acceptance of this offer, I shall make all necessary contracts in my own name, and when completed I shall deliver into your possession these buildings, which shall be named the Henry W. Maxwell Memorial." The new Long Island College Hospital is to consist of four sections. The two sections proposed to be erected by Mr. Maxwell are to form the main building on Henry Street. There are



to be wings on the Amity Street and Pacific Street sides. It is expected that friends of the late Dr. Alexander J. C. Skene will erect the Amity Street wing as a memorial to him, and it is intended to make an appeal to the public for funds with which to build the Pacific Street wing. George Foster Peabody and his brothers, Royal and Charles Peabody, it is said, have offered to defray the expense of equipping an operating amphitheater on the top floor of the Amity Street wing to accommodate 250 students.

The whole hospital structure will cost in the neighborhood of \$1,000,000 and it is expected will be one of the most perfectly equipped in the whole country. In addition to the hospital building the institution possesses the Hoagland Laboratory, erected on Henry Street, opposite the hospital, by Dr. Cornelius N. Hoagland, the Polhemus Clinic, on the southwest corner of Amity and Henry Streets, erected by Mrs. Caroline H. Polhemus, as a memorial to her husband, Henry D. Polhemus, and a home for nurses known as the Dudley Memorial, built by Henry W. Maxwell, in memory of Dr. William H. Dudley, one of the organizers of the German Central Dispensary which afterward became the Long Island College Hospital. The latter building has just been completed and turned over to the Board of Regents of the hospital by Mr. Maxwell's executors. It is on the southeast corner of Henry and Amity Streets.

**Dr. Lederle Is Praised.**—After a searching examination conducted by a large number of individuals under the direction of a special committee the City Club to-day makes public what is termed "A Statement of Facts" concerning the Health Department of this city. This pamphlet is to be widely distributed, and while it is stated that it is not a campaign document and is declared to be the desire of the club to present facts without reference to their political effect, the committee points out that the mere recital of the facts involves an inevitable contrast between the administration of this department under Commissioners Murphy and Sexton and under Dr. Lederle. The report is signed by Messrs. Charles C. Nadal, William H. Baldwin, Jr.; Horace E. Deming, Wheeler H. Peckham and Thomas R. Slizer.

It says that "among those informed upon the subject, the Department of Health has long been believed to be one of the most corruptly profitable of the city departments. In recent years, at least, there has been no legislative investigation of this department, as there has been of the Police Department and of some others. Persons who made special investigation of the matter charged that the aggregate of blackmailing by officials of the Health Department amounted to fully \$1,500,000 a year. An investigation in February, 1902, showed that in more than a thousand cases unlawful nuisances had been continued with the connivance of the department. Upon taking charge of the Health Department Dr. Lederle found that for four years it had been the refuge for the faithful of Tammany Hall, rather than an instrument of government. Helpers put down on the pay rolls as clerks and drawing good salaries were sitting around the corridors smoking and gossiping, and some of the employees would often stagger to and from their work in a state of intoxication. For one old, broken down politician the title of 'custodian of records' had been created, although the records were really kept by the registrar.

"Dr. Lederle immediately dismissed 157 employees. One whole division in the sanitary bureau was abolished and two other divisions were consolidated into one. When the reclassification of employees was completed it was found that about \$100,000 had been saved

to the city annually in salaries alone. He has dismissed twenty employees under charges of intoxication, wilful neglect of duty, failure to report and making false reports, and fifteen have resigned under charges.

"During Mayor Van Wyck's administration requisitions for supplies made by the various offices, laboratories and hospitals were regularly presented to the president's private secretary, who wrote upon each requisition the names of persons, firms or corporations to be asked for estimates. The present practice of the department is to obtain an estimate in each case from two or more reputable manufacturers or regular wholesale dealers. The food supply for the hospitals and some of the miscellaneous supplies which are used in great quantities are bought under annual contracts made after competitive bidding. Before 1902 this was the practice only as to coal."

Three times as much money was collected for violations of the Sanitary Code last year by Dr. Lederle as by his predecessor. In 1902 the department renovated twice as many houses which had been occupied by consumptives as had been renovated the year before. There was a decrease of seven per cent. in the number of deaths from consumption.

**Estate of Dr. T. G. Thomas.**—The will of Dr. Theodore Gaillard Thomas was filed for probate with the Surrogate last week. Dr. Thomas died Feb. 28 at Thomasville, Ga., leaving an estate believed to amount to more than \$1,000,000.

#### PHILADELPHIA.

**Dr. Kirk Selected as Representative to International Congress.**—Dr. Edward S. Kirk, Dean of the Dental Department of the University of Pennsylvania, has been selected by the State Department to represent this country at the Fourteenth International Congress of Medicine which meets at Madrid, April 26.

**Finsen Light Apparatus at Polyclinic Hospital.**—The authorities of the Polyclinic Hospital recently gave to invited guests a demonstration of the Finsen light apparatus that has lately been installed in that institution, the first in the city to treat diseases with concentrated light. Two patients have been undergoing treatment by the light since its instalment two weeks ago.

**Wholesale Murder by "Herb Doctor" Suspected.**—The arrest of George Hossey, a so-called negro herb doctor of this city, is believed to be the first step in the unearthing of a long list of murders that may number thirty or more. The negro is charged with being an accessory to the murder of William Danz in the summer of 1901. He has been dispensing medicine for years and in view of the ease with which poison was obtained from him by a detective, ostensibly for the murder of a woman, the authorities believe that many other persons secured poison for the same purpose.

**Cooper Hospital May Suffer Severe Loss.**—The recent decision of the Court of Errors and Appeals at Trenton upholding the claim of the city of Camden for taxes on all property owned by the Cooper Hospital and not directly used for hospital purposes will, it is said, cause a reduction in the income of the hospital from its real estate holdings of between three and four thousand dollars. This diminution in revenue will, it is feared, curtail the work of the institution. The hospital has never received any public support, having been built, endowed, and maintained by private funds coming almost entirely from members of the Cooper family.

**Difficult to Enforce Law Against Expectorating.**—The enforcement of the provisions of the ordinance of Councils, declaring the practice of expectorating on the sidewalks of the city, in cars or other conveyances,

a nuisance prejudicial to health, and imposing a fine of \$1 and costs upon all offenders, which became a law on March 10, is causing the police officials some concern, but it will be enforced by them, if possible. Several conferences have been held by the officials of the Bureau of Police regarding the provisions of the measure, and the best manner of carrying the same into effect, but no definite action has as yet been taken further than the issuance of orders by Director of Public Safety English through Superintendent Quirk to the patrolmen in the representative districts to arrest all offenders. Select Councilman Wiltbank, who introduced the ordinance, is in favor of placing a notice on every telegraph and telephone pole in the city, calling the attention of the public to the provisions of the law.

**To Prepare Physicians for Tropical Service.**—Leading physicians of this city formed on March 9 the Philadelphia Society of Tropical Medicine, the object of which is to prepare students of medicine and graduate physicians for service in the tropical dependencies of the United States. This Society is the first of the kind to be organized in this country. This organization is another evidence of the recognition in Philadelphia of the growing needs of a knowledge of this branch of medicine. The number of members already enrolled is an encouraging one. The officers are: President, Dr. T. H. Fenton; Vice-Presidents, Drs. J. C. Wilson and J. M. Anders; Secretary, Dr. Joseph McFarland; Treasurer, Dr. E. B. Gleason; Executive Committee, Drs. J. V. Shoemaker, T. H. Fenton, Judson Daland, R. G. Curtin, Orville Horwitz, and Hobart A. Hare.

**Birth of Double Monster.**—On March 15 a woman in the southern part of the city gave birth to a freak consisting of two male fetuses with perfectly formed heads and limbs but joined from the shoulders to the hips by a band of tissue apparently partly cartilaginous. But one umbilicus was present, indicating a common circulation. The twins weighed eleven pounds. One was dead when born and the other died very shortly afterward. As we write this letter efforts are being made to secure permission for a post mortem to reveal the true condition present.

**A Probable Case of Hodgkin's Disease.**—At the meeting of the Pediatric Society held March 10, Dr. D. J. Milton Miller exhibited a patient, a boy of fourteen years, showing marked enlargement of the cervical glands and with symptoms of mediastinal involvement. The condition began when the boy was seven years of age as enlargement of the submaxillary glands of the left side. These were removed in 1899. In eight months others in the same region were removed. In ten months they reappeared and were removed, one gland being examined and found tuberculous. In 1902 enlargement again appeared and, for the first time, on the right side. The boy is anemic and the spleen and liver are slightly enlarged. There is now a slight enlargement of the epitrochlear, axillary and inguinal glands. None of the glands have ever showed a tendency to break down or suppurate. The patient's temperature is slightly subnormal. Dr. Miller believes the case to be one of lymphatic tuberculosis with the physical signs of Hodgkin's disease and hence to be classified under that name. In some cases there are reasons for thinking that Hodgkin's disease is tuberculous in nature although many varieties of disease are undoubtedly classified under that name.

**The Use of the Electrothermic Angiotribe in Cases of Varicocele.**—At the Philadelphia County Medical Society March 11, Dr. Orville Horwitz reported the use of the above instrument in a case of varicocele with gratifying results. He spoke first of the indications for operation upon the veins of the cord,

mentioning among other statements the fact that he had never seen any amelioration in cases of spermatorrhea follow such procedure. Of the operation for varicocele the open method is much better than the subcutaneous. By either method, however, there is an occasional case of infection from an imperfectly sterilized ligature. Such infection manifests itself at times so late as ten or twelve days after operation. With the hope of securing a method that will obviate this danger, Dr. Horwitz recently tried, in the case of a large varicocele, the electrothermic angiotribe devised by Dr. A. J. Downes of this city. The veins were exposed, the instrument applied and the current passed for forty seconds. No sutures were needed to bring together the ends of the veins hence those undesirable adjuncts were entirely avoided. Recovery was rapid, being complete in eight days, and the operation was followed by no tenderness about the wound nor any evidence of orchitis. So far as the one case can indicate, the use of this angiotribe appears to be the ideal method for the open operation for varicocele. The points in its favor are: (1) It substitutes a less dangerous and more scientific method for the older ones; (2) there is less danger of secondary hemorrhage; (3) there is less danger of consequent thrombosis; (4) there is less pain following the operation; (5) there is no resulting orchitis.

**The Role of Intracellular Catalytic Processes in the Pathogenesis of Malignant Neoplasms.**—Dr. John C. Hemmeyer, of Baltimore, as the guest of the Philadelphia County Medical Society, read an interesting paper on this subject. He prefaced his remarks by saying that cancer pathogenesis may be looked upon as a growth of tissue under difficult circumstances. The theories of Thiersch, Cohnheim, Ribbert and others regarding the origin of cancer were briefly discussed, some time being devoted to the consideration of the bacterial theory of origin. Among the difficulties in the way of accepting this theory are: (1) Metastases, these always being tumors like the original and like the organ in which the original tumor developed; (2) by this theory the parasite must live within the cell of the tumor and yet not injure it; (3) it is necessary that every cell contain a parasite and that the parasite divide at the same time that the cell does during multiplication; (4) cancers cannot be transplanted, at least not from man to animals; (5) primary cancer rarely occurs in multiples, which would be expected if parasites were the cause; (6) cancer invades cells of its own type, hence there must be a parasite for each type of cancer. Dr. Hemmeyer's attitude toward the parasitic theory is that of agnosticism at present, but he is willing to be convinced. The parasitic origin of cancer has not yet been proved, hence cannot now be accepted. Dr. Hemmeyer briefly detailed some experiments looking to the artificial production of cancer that he has made during the past three years. He had the good fortune to secure a dog that had carcinoma of the stomach. In view of the facts that the stomach is of all organs the most frequently the seat of carcinoma and that certain chronic peptic ulcers apparently undergo transformation into carcinomata it occurred to him that if peptic ulcers were produced in animals it might be possible to observe their transition into carcinoma. The cancer in question was transplanted into other dogs but did not grow. Peptic ulcers were then produced artificially in the stomachs of dogs and portions of the cancer transplanted around them but no growth was induced. Filtered extract of the cancer was then injected into the border of the ulcers and in one instance an adenoma followed, the peptic ducts penetrating the submucosa and muscularis. Though it is not possible to prove that the adenoma developed as



a result of the injection of the filtrate it suggests that there might have been something in the nature of an enzyme in the cancer cell filtrate that stimulated the cells of the stomach, in the presence of a lesion, to new growth. In a number of cases where the filtrate was first heated, no stipulation of the cells resulted. Experiments seeking to determine if cancer cells have a method of growth differing from that of normal cells were then undertaken by Dr. Hemmeter. Free cancer cells and also cells from fresh normal mammary gland were obtained by penciling and careful manipulation. The action of these cells when placed in an isotonic solution was found to differ, the cancer cells contracting and those from the mammary gland retaining their original size. This indicates that water goes into the tumor when it is growing. Normal cells were found to swell when placed in cancer juice. These and other undetailed facts point to the conclusion that the cause of cancer may be innate in the cell itself. This is not a far-fetched theory when the complex chemical organization of cells is taken into consideration. At least ten enzymes have been isolated from liver cells. It has been determined that there is in the normal cell an enzyme that controls the construction of the protoplasm within that cell. Hence there may be an enzyme, similar in nature, in the cells of malignant neoplasms that controls their growth. The reversibility of enzymes is also a factor to be taken into consideration. This suggests that there is possibly a normal defence against carcinoma in some of the tissues of the body. An argument in favor of this is the fact that most of the metastases in carcinoma are by the lymph stream instead of the blood. Cancer cell masses, as thrombi, are often observed in blood vessels near the tumor and yet there are no metastases from them. Does the blood destroy the specific enzyme in the cancer cells until it is overwhelmed by the latter? Experiments indicate there is some body in the plasma that does destroy the cancer cells or inhibit their growth. Treatment of cancer along that line is thus suggested. Dr. Hemmeter admitted that much of the latter portion of his address was theoretical but had a basis in the experiments that were briefly detailed.

#### CHICAGO.

**New Medical Practice Act.**—On March 6, Mr. Weaver introduced a new medical practice act in the legislature, proposed by the Illinois State Medical Society. This act creates a State Board of Medical Examiners, consisting of seven members, who shall be appointed by the Governor with the advice and consent of the Senate. The appointments are to be made from persons nominated by the State Medical Society, and every incorporated society having an actual membership of not less than one hundred licentiates in medicine and surgery, and embracing membership from at least twenty counties, may submit nominations. The term of office is to be seven years.

**Smallpox.**—During the week ended March 7, 13 cases of smallpox were discovered; two patients died at their homes, and 11 were removed to the Isolation Hospital. There are now nearly 60 patients at the hospital, and 20 deaths have occurred. During February, 180 cases of smallpox were reported to the State Board of Health from forty-five localities in thirty-four counties. In 1902 there were about four thousand cases in the State in February, and the diminution is undoubtedly due to the persistent efforts of the State Board of Health to enforce vaccination. There is still some difficulty met with in handling the disease, because it is often not at first recognized as smallpox. The spread of the disease in many localities is due to the refusal of the

local health authorities to accept the diagnosis of the attending physician. They call on the State Board of Health for an Inspector before taking action, and many may be exposed before he comes.

**Decreased Mortality.**—According to the weekly bulletin of the Health Department, there were 118 fewer deaths reported during the week ended March 7 than during the previous week, a decrease of 16.5 per cent. The mortality rate is still high, however, when compared with that of 1902. The total deaths for the week numbered 595, as against 713 for the last week in February, and 515 in the corresponding week of 1902.

**Liability of Hospital for Assault on Patient.**—The case of Galesburg Sanitarium against Jacobson, as it is entitled in the Appellate Court of Illinois, Second District, was brought by the latter party to recover damages from the former, a corporation conducting a hospital, in which he was a patient some two months, and he alleged, was assaulted, beaten, mistreated, and injured by the servants and employees of the institution. He was ill, the Court says, and was a patient residing at the hospital for treatment, and was paying for the services he received, and he was entitled to reasonably kind treatment, so far as the nature of the malady will allow. No assault on him was justifiable, except so far as it was necessary to control him at times when he was insane or delirious. On the occasion in question, the servants unnecessarily abused him, and inflicted on him injuries for which the jury were warranted in holding the master responsible. There was no claim that this was a charitable institution, nor any question as to its liability for the negligence of its employees on that account. The fact that the jury awarded but \$100 as damages indicated they were not governed by passion or prejudice.

#### GENERAL.

**Septic Sewerage.**—The annual report of the Connecticut Sewerage Commission gives exclusively the report of results of two years' test of Worcester, Mass., sewerage in a septic tank, by Professor Kinnicutt, of the Worcester Polytechnic Institute. The experiments have been made in a tank fourteen feet long and five feet in diameter, and the Commission characterizes the report as "a distinct contribution to the sum of knowledge of the principles of sewage disposal by the septic tank which is now an essential part of the disposal system of many cities." The Commission opposes strongly sewerage into running streams, urges the reforestation of water sheds for public supply, and suggests that the grave problem of sewerage at Waterbury and in the Naugatuck valley may have to be solved by a great trunk sewer to the Sound on the plan proposed for the Passaic valley in New Jersey.

**Insanity and the Population.**—The Washington *Times* of March 7 has the following account of a lecture given at the national capital by Dr. William A. White of Binghamton.

He gave a lecture before the National Geographic Society on the "Geographical Distribution of Insanity." Facts and figures accumulated in his lecture, showing that insanity is increasing comparatively much more rapidly than the population. He ascribed as a cause of this heredity, the unrestricted marrying of mentally diseased, and the fact that this country is the dumping ground of the trash of Europe. The latter assertion he supported by quoting figures showing that 25 per cent. of the 25,000 insane persons confined in New York asylums were of foreign birth. He stated that the region of the least insanity was that section of the West from the Rockies to the Mississippi, comprising the great agricultural and stock raising belt. Insanity was



most prevalent, he stated, in regions where the struggle for existence raged the fiercest and the competition was the greatest. The two greatest centers of insanity in the United States, he said, were New England, where there is one insane person to every 335 inhabitants, and in California, where out of every 380 people there is one lunatic. He showed that insanity was unknown among the Indians, and almost so among the negroes in the South, although in the North, where the negro comes in competition with the white laborer, the suicide rate runs to a high point. Agriculture seems, from the figures he presented, to be the occupation least liable to produce insanity. Dr. White considers that the principal causes and agents of insanity were alcoholism, mental worry, despair, disappointment, and all other pains which afflict the mind of the highly civilized individual, and those who live where the struggle for existence is pitiless.

**Honor for Dr. Lyle.**—Friends of Miss Annie G. Lyle, M.D., who was graduated from the Johns Hopkins Medical School in 1902, will be gratified to learn that she has been appointed assistant to Professor Esrech, in the University of Vienna. Professor Esrech is a noted specialist in diseases of children, and this recognition of Dr. Lyle's medical ability is an honor such as falls to few Americans, especially in such a conservative center of medical research as the University of Vienna.

**American Medical Association Meeting.**—For this occasion the Mobile and Ohio Railroad will make a rate of one first-class fare for the round trip, viz.: \$18 from St. Louis, \$23 from Chicago. Tickets sold May 1 to 4, inclusive, limit 10 days, with privilege of extension to May 30, on payment of 50 cents. Write Jno. M. Beall, A. G. P. A., St. Louis, for full particulars concerning rates.

**Meeting American Medical Association New Orleans, La.**—On account of the above occasion the Southern Railway will sell tickets for the round trip, limited 10 days, for one fare. From the trunk line territory the rates will be based on regular fares to Washington or trunk line western termini, added to one first-class fare therefrom, limited to continuous passage, and will be sold May 1, 2, and 3, with final limit 10 days from date of sale. By deposit of ticket by original purchaser, and payment of 50 cents, to joint agent, New Orleans, not later than May 12, extension of final limit may be obtained to enable the purchaser to reach original starting point not later than May 30, 1903. The Southern Railway operates three trains daily from New York, carrying Pullman sleeping, dining and observation cars. By the request of members of the American Medical Association in the East, on Saturday, May 2, special service has been arranged to leave New York at 4.25 P.M., via Washington, Atlanta and Montgomery. Those desiring Pullman reservation should send in their names as soon as possible. Time, New York to New Orleans, 39 hours. For further information call or write New York Offices, Southern Railway, 271 and 1185 Broadway.

**College of Physicians and Surgeons, Baltimore.**—Post-graduate courses in medicine, surgery, gynecology, obstetrics, diseases of eye and ear, pediatrics, diseases of the gastro-intestinal canal, nose and throat, genito-urinary and diseases of the skin, nervous diseases and electrotherapeutics, X-ray diagnosis and pathology will be given beginning May 1 and extending to June 15. Laboratory courses in clinical medicine, pathology, bacteriology and anatomy are also offered.

**Baltimore Items.**—Dr. M. B. Tinker has tendered his resignation as assistant resident physician at the Johns Hopkins Hospital. The resignation will go into

effect April 1. Dr. Tinker expects to practice in some other city.

Dr. Howard A. Kelly leaves here early in April to attend the International Gynecological Congress in Madrid, where he will give his latest researches.

The University of Maryland is having plans drawn up for the erection of new pathological, bacteriological and clinical laboratories.

**Obituary.**—Dr. Manuel Barros Borgoño, the eminent surgeon and rector of the University of Santiago, is dead.

Dr. A. W. Church, a nephew of the late Dean Church, canon of St. Paul's Cathedral, London, died of appendicitis last week at St. Francis's Hospital, Jersey City. He was thirty-two years old. He graduated from the Edinburgh University, Scotland, and the Columbia Medical School, of New York. Church formerly practised in Waretown, N. J.

Dr. John Hammell Brower Browning died Tuesday at Smithtown Branch, L. I. He was graduated from the Columbia University Medical School in 1883, and was at times assistant resident physician of the insane asylum on Ward's Island and house physician and surgeon of St. Francis's Hospital.

Dr. Wm. P. Munn, former president of the Colorado State Medical Society, and also recently the head of the Board of Health of Denver is dead from hemorrhage of the lungs.

Dr. George Beers died from pneumonia last Monday, at his home, No. 375 Central Park West. He was thirty-three years old and had been ill about three weeks. He was born in New York and was graduated from the College of the City of New York. He had been practising medicine in this city for eight years. He leaves a widow and two sisters.

## SPECIAL ARTICLE.

### EXCURSIONS IN OLD NEW YORK MEDICINE. II

JOHN STEARNS, FIRST PRESIDENT OF THE NEW YORK ACADEMY OF MEDICINE.

WE began this series of excursions in old New York medicine with a sketch of the life of Dr. John W. Francis, the second President of the New York Academy of Medicine. It was not because the first President of the Academy, Dr. John Stearns, did not deserve the first place, but because Dr. Francis' life and writings mean so much for the students of old New York medicine, and because his contributions to general and medical sources are stores of valuable material that every one must avail himself of if he would know the special contemporary history of the times.

The first President of the New York Academy, Dr. John Stearns, will ever deserve the kindly remembrances and loving veneration, not only of the members of the medical profession of New York City and State, but of the United States, for his unselfish exertions in bringing about for the first time in this country a union of the medical profession, and securing the enactment of the first laws for regulating the practice of medicine. It is to Dr. Stearns' efforts more than to those of any other one man that the present legal position of the medical profession in America is due.

Dr. Stearns was born in Wilbraham, Mass., in May, 1770. He graduated from Yale College with distinguished honors in 1789. He was a medical student in the office of Dr. Erastus Sergeant of Stockbridge, Mass., until 1792, when for a year he went to Philadelphia and attended the lectures of Shippen, Wistar, Rush and others at the University there. In 1793 he began the

practice of medicine near Waterford, Saratoga County, N. Y. He proved a successful practitioner, and, before five years, began to agitate the question of union among physicians in order to elevate the dignity of the profession and extend its usefulness. A series of newspaper articles, some written, others inspired by him, relative to the importance of establishing medical societies, appeared in Saratoga, and about the year 1800 a medical society was actually formed. The movement proved to be premature, however. The materials of which it was composed were discordant, and it ultimately broke up without effecting anything definite.

Five years later, in November, 1805, a meeting was held at Ballston, N. Y., that was to be fraught with the happiest of consequences for the physicians of New York State. Besides the members of the profession in Saratoga County, the cooperation of the physicians of the adjoining counties of Washington and Montgomery was asked and a printed circular was issued, calling the attention of the profession to the importance of legislation, for the appropriate legal regulation of the practice of medicine in this State. In the *Annals of the Medical Society of the County of Albany*, 1806-1851, with biographical sketches of deceased members, by Sylvester D. Willard, M.D. (published by J. Munsell, 78 State street, Albany, in 1864), which is our authority in this matter, it is stated that the leading spirit in this enterprise was Dr. John Stearns of Saratoga. Associated with him were William Patrick and Grant Powell. The meeting was adjourned until January 16, 1806, when the friends of the measure met and memorialized the legislature for the establishment of a medical society.

The memorial did not at first contemplate that it should embrace more than the three counties of Saratoga, Montgomery and Washington. Fortunately for the cause of science, Dr. Alexander Sheldon, of Montgomery, was elected Speaker of the Assembly in 1806. The memorial was referred to a committee of the House, a majority of which were medical men, and they, after examining the bill presented, and realizing how beneficial such a measure would be for the entire commonwealth, suggested at once that instead of a local measure, a general law for the whole State should be recommended. A bill was accordingly drawn up and after careful consideration was presented to the House. The old biographer of Dr. Stearns says "Strange to record, it met with a powerful opposition, and feeble hopes were entertained of its success." Now, after a hundred years of experience with legislation with regard to medical matters, the profession of the Empire State may look back and think that it is never strange when attempts to pass medical measures meet with opposition, since that has been the constant experience.

The bill had been wisely framed, however, and the critical juncture, when its rejection seemed almost inevitable, the Hon. William W. Van Ness (may his name ever be in benediction!) became its most eloquent and powerful advocate. In a speech that was long remembered and whose eloquence became a tradition, he refuted the arguments of the opponents to the bill and pointed out the benefits likely to accrue from the proper regulation of medical affairs in New York State, with such enthusiasm and directness that the passage of the bill was secured. The law was enacted April 4, 1806.

The new institution thus created, received the name of The Medical Society of the State of New York. It owed its inception to the tireless energy of John Stearns. He gave it his time and influence during its early struggles and to him, more than to any other, is due its successful organization and the position of respect that it came almost at once to occupy.

Dr. Stearns became its first secretary and continued to fill the office for several years.

The position of secretary gave him a wide acquaintanceship and his executive ability attracted attention. He was elected to the New York State Senate and served for four years. After his term he continued to reside and engaged in practice in Albany. Here he proved very successful. In 1817, he was elected president of the New York State Medical Society and was reelected for three successive years, until 1820, an honor that has never been conferred on any President since. Toward the end of his term as President of the State Medical Society, Dr. Stearns removed to New York where he became prominent as a practitioner and consultant and contributed a number of articles to the medical periodicals of the day.

When the New York Academy of Medicine was organized in 1846, it felt that its first president should be a man distinguished not only in the profession, but also in public life and known to all the State for liberality and uprightness of character. Dr. Stearns accordingly became the first president. At the time he was over seventy-five years of age, but he was still not only possessed of vigorous mentality, but was also active in the pursuit of his professional duties.

His address before the Academy, when taking the position of President, contains some striking sentences that deserve to be quoted. He said: "Let no impostor obtain admission within its sacred walls. Let the inscriptions of your portals be 'Esto perpetua' (Mayst thou last forever). Remember the Academy is consecrated to health, to happiness and to harmony, which I trust will always be its prominent characteristics and may it be the nursery of thousands and tens of thousands and rise like the sun in all its meridian glory to shed its scientific rays over the whole world." The closing sentences of the address are "Could I be assured of the uninterrupted, enduring prosperity of the Academy in disseminating health, happiness and sustaining principles of life, I should die in peace with effusions of gratitude and praise to Almighty God, for his permanent blessings upon our labors."

Only a little more than a year after taking the chair of president of the Academy, Dr. Stearns became a martyr to his desire for medical knowledge. His death was the result of a dissection wound, received while performing an autopsy on an interesting case whose condition the enthusiastic old physician wished to investigate very carefully, because it had proved so puzzling during life. At the time of his death he was in his seventy-ninth year and his obsequies were attended by many of the most prominent people of the city. His private life had furnished the example of a good citizen an unselfish gentleman a trusty friend and an honorable professional man.

There was, forty years ago, in old St. George's Church, New York, a tablet to his memory, which had been erected by his fellow members of the congregation as a testimonial to the faithfulness of his observance of his religious duties. Old St. George's has disappeared, however, giving place to the Mott Iron Works. The tablet to Dr. Stearns should have found a place in the archives of the New York Academy of Medicine, but did not. The present board of church wardens of St. George's Church, though it contains a direct descendant of Dr. Stearns, have no definite information of the present location of the tablet or whether more than a copy of it was preserved in the tearing down of the old church.

Dr. Stearns' principal contribution to medicine was an article, published in 1807, in the eleventh volume of the *New York Medical Repository*. It contained his observation on the use of ergot in obstetrics. Dr.



Stearns was the first to direct attention to the value of this drug and his reputation as a thorough-going conservative practitioner tempted many physicians to employ it much sooner than would otherwise have been the case, and so led to the speedy introduction of the drug into American practice. His observations with regard to it are entirely original and are of distinct value, even at the present time, for they show that he realized the necessity for using it carefully and with proper regard to the conditions of the pelvic outlet in the particular case. At that time the substance was used as a powder rather than in any extract form, and Dr. Stearns speaks of it by its principal therapeutic activity as *Pulvis parturiens*.

At its recent annual meeting, the Medical Society of the State of New York appointed a committee to begin preparations for the celebration of the one-hundredth anniversary of the foundation of the society. The memorials of that time are mainly wrapped up in the life of Dr. Stearns. For, besides having been the first President of the Academy, he was one of the founders of the New York State Medical Society, and one of those to whom came the first idea of the formation of the American Medical Association. It is rather interesting to find then a bit of startling evidence of how much the present movement for the preservation of historical relics and details that is now in progress was needed to find that it is extremely difficult to obtain a portrait of Dr. Stearns for reproduction. The New York Academy of Medicine, has an oil painting, presented some thirty years ago to the Academy by the Stearns family, and of this the Stearns family have a replica. Of printed portraits, however, there are very few, if any, extant. At the Academy of Medicine the impression is that they have no printed portrait and they know of none in existence. We hoped to print a reproduction of the grand old man of New York medicine, to whom the profession owes so much, but found it impossible to do so, and we sincerely hope that one of the first proofs of the activity of the One-hundredth Anniversary committee will be to make available more memorials of the life of so worthy a member of the New York profession.

## CORRESPONDENCE.

### THE NEGRO PROBLEM.

To the Editor of the MEDICAL NEWS:

DEAR SIR: I have been greatly interested in an article which recently appeared in your journal touching the negro problem. I think you will agree with me that this is by far the most momentous question before the people of the United States, and the one which most urgently presses for consideration. It is at this moment of vital importance to the whole people, irrespective of politics, section or race, yet nobody seems to give it serious study. Instead of scientific investigation, conducted with a single eye to the facts, we have silly sentiment, hysterical irritation or narrow partisanship. We want facts, and facts on a large scale, gathered with scientific impartiality, or a basis for rational action; for without such a basis we shall but—in scriptural phrase—stretch out the line of confusion and lay the stones of emptiness.

It is a fact that widespread uneasiness prevails, lest the negro population, which now numbers about nine millions, and is increasing, should imperil our social conditions and even our civilization, in the not very remote future. It is another fact that race-hatred seems everywhere smouldering beneath the surface, and almost daily breaking out with results that all men must de-

plore. But after deploring, is it not time to look upon these things as symptoms of a deep-seated evil which urgently calls for remedy? If the course we are now pursuing with the negro is the best possible, let us make sure of the fact, and go on with it; if otherwise, let us try to find out what course will be better.

What is just now important to know is: Have the negroes, as a people, progressed or retrograded since their emancipation? Are they growing more orderly, law-abiding, and moral, or are they growing more lawless, vicious, and criminal? Do statistics show that the "education" we are giving them is making better men and citizens of them—in other words, are "educated" negroes (in proportion to their numbers) less vicious and criminal than the illiterate? Let us know the facts, and we shall know where we stand, while sentimentalism without knowledge may lead us astray.

President Roosevelt's sentimentalism does honor to his heart, but unless his actions are guided by wisdom as well as sentiment, he may give the objects of his sympathy (in scriptural phrase again) the valley of affliction for a door of hope. I am, sir, etc., H.

Baltimore, Md., March 17, 1903.

## TRANSACTIONS OF FOREIGN SOCIETIES.

### German.

THE COMBAT AGAINST TUBERCULOSIS AS A NATIONAL DISEASE IN GERMANY—INDICATIONS OF SURGICAL TREATMENT OF CHOLELITHIASIS AND CHOLECYSTITIS—THE ROLE PLAYED BY HEREDITY IN PHTHISIS.

J. KATZ, at the Berlin Medical Society, Jan. 14, 1903, contributed a paper on the "Combat in Germany against Tuberculosis as a National Sickness." He began with a few introductory remarks upon the necessity of discussing the entire question, and presented a number of statistics, the burden of which was that in 1894 there were 36 tuberculous patients in every 10,000 inhabitants, which decreased in 1896 to 28, and rose again in 1901 to 35. This variation gave rise to the question whether the conditions of treatment were such as to enable physicians to cope successfully with tuberculosis as a national illness. The results of the so-called cures, especially those which involved reestablishment of strength for earning the living of the patient and somewhat protracted restoration of health are, according to the statistics of Englemann, very interesting. For example, out of 60,273 patients reported from 31 sources in Germany, among whom one-third were in the early stage of the disease, 56 per cent. had died or had reached a condition of total helplessness so far as earning their living was concerned. Englemann concludes that these results may be made better and would be made more satisfactory if the patients came earlier to the sanitariums, but even against this supposition the facts of his own statistics speak, for if after 3½ years only 44 per cent. of the patients are able to earn their own living, as a matter of fact, we do not know among these what the condition of their lungs may be. Moreover, common experience shows daily that many phthisical patients continue to follow their vocation up to the final stage of the disease; especially is this the case among those who leave some sanitarium with the suggestion strongly fixed in their minds that they were cured. There is, however, in the opinion of Katz, no doubt that the establishment of sanitariums has worked some good results, notwithstanding the fact that some of the cures were not altogether satisfactory. In the movement up to the present time, the importance of the climate seems to have been altogether belittled. This importance is of the degree formerly given it by physicians, namely, that it is not enough to send the patient away to some sanitarium



or healthy locality for a few months, but to give him open-air occupation for a long time. In order to reach both of these purposes, these patients should be sent to a healthy, favorable climate, like that in German South or West Africa. Its geographical position and the great height of the land produces a rather constant dry, clear atmospheric condition, and thus resembles very closely the conditions found in the Transvaal, which has been used by the British for a long time for the same purpose.

W. KOERTE, at the Society for Internal Medicine in Berlin, Jan. 12, 1903, read a paper on the Indications for Surgical Interference in Cholelithiasis and Cholecystitis. He stated that the surgical treatment of these conditions has been exaggerated, precisely as in other similar diseases. One group of surgeons wish to operate in every case, just as soon as symptoms arise, and the other group are prepared to wait, if anything, too long. From the basis of 300 cases of this disease he has drawn the following conclusions as to the proper time for operating: When there are no adhesions of the gall-bladder to the surroundings, the operation becomes easy, and its prognosis favorable. If, however, adhesions are present, this operation may become one of the most difficult. The dictum to operate in the early stages of the attack for every stone is, nevertheless, not justifiable, because there are many stones that never pass over into the second stage, namely, that of causing another violent inflammation. On the contrary they remain latent for years and sometimes up to the end of life never cause another attack of the disease. There are cases of gall-bladder colic, also, which do not belong at all to the stones themselves, because Naunyn has already shown that acute inflammation of the gall-bladder may cause precisely the same train of symptoms. Similarly, an acute infection of hydrops of the gall-bladder may lead to a similar clinical picture. In the third place, gall-stones which have for years been without symptoms may set up an acute attack when infection of the gall-passages is present. From these facts it is obvious that one should operate, not on account of the diagnosis, but on account of the kind and degree of inflammation present. Another point is the question whether the operation will guarantee freedom from symptoms. The answer to this question is not at all easy. Late symptoms may follow in the form of a true relapse and renewal of the stones, in the same manner as they were originally, which is not a common occurrence or they may arise from a small piece of stone left at the first operation, which even the most skillful operator may overlook. Finally, the symptoms may be caused by adhesions. The author handles these cases in the following way: If the seizure is light in degree, rather chronic in type and without severe infection, and with only a mild jaundice, he does not do the operation. If the case is, however, relapsed, or if the social condition of the patient demands a rapid return to his vocation, then he decides more readily upon an operation. In cases that, notwithstanding a competent and proper internal treatment, go on to a marked degree of the disease, he also operates, because in such individuals the possibility of late symptoms is less important than the condition of the present attack. If there remains a hard tumor between attacks, inflammation of the gall-bladder is to be feared, and the danger of a rupture of it or of a post infection of it is present. Absence of fever does not guarantee absence of pus, which is exactly the same phenomena as is seen in cases of perityphlitis. It is better to operate after the attack, except in those cases where the danger of perforation of the gall-bladder is to be feared. If there are stones in the bile-duct, operation is indicated without qualification, on account of the danger of cholaemia and abscess of the liver. He

usually waits in such cases, unless urgent indications are to the contrary, six weeks after the attack; if at that time the jaundice has not disappeared, he again operates. In cases of gall-stones complicated with carcinoma of the gall-bladder, the prognosis is decidedly unfavorable, exactly as in patients with carcinoma of the head of the pancreas.

REICHE, at the Physicians' Society in Hamburg, Jan. 13, 1903, read a paper on the Value of Parental Infection in Phthisis. The supposition that heredity exercises a dominating influence in phthisis has less support through the slow and steady decrease in the frequency of tuberculosis, which has been easily established in all civilized lands during the past ten years. The majority of tuberculous cases develop and are established during that period of life when marriages occur and children are born. It is therefore astonishing that the record of this disease is slowly decreasing. The material of this author is the following: Of 3,022 cases of phthisis which were investigated in the last year, 2,476 were able to give satisfactory information about their parents. Consumption in the parents was present in 33 per cent., practically one-third of all the patients among the men 28 per cent. and among the women 44 per cent. Of these, the father was afflicted in 55 per cent. and the mother in 33 per cent., and both parents in 12 per cent. Among 2,450 individuals who, after examination, could not be pronounced tuberculous, but who belonged to the same period of life and had the same conditions of occupation, only 16 per cent. later proved to have the disease. These figures correspond with the figures of other authorities so accurately that they should be regarded as a basis of consideration. There is therefore no doubt that the children of parents who are tuberculous fall victims to the disease in very large numbers. The doubt arises, however, that it is not so much a matter of increased disposition to the disease, but rather a pronounced and continued exposure to it.

#### THE LATE DR. THOMAS.

To the Editor of the MEDICAL NEWS:

DEAR SIR: Many have most kind recollections of the great surgeon and physician, Professor T. G. Thomas. He has done a great and beautiful work. His whole practice has been marked by scientific principles, broad comprehension, and high and noble purposes. His book on Diseases of Women is a standard work, and one of the best that has been written on the subject.

It has been my privilege to consult Dr. Thomas in many cases. His excellent judgment and clear discrimination helped in any emergency. Once a patient of mine in Brooklyn had most fearful hemorrhages, apparently she was near death. An eminent surgeon had been in consultation with me; he said it was cancer, and the history of the case would be repeated hemorrhages till she died. "But, Doctor," said I, "I saw a vesicle, it is surely fungoid growths." I could not stand still, late that Saturday night, then past eleven o'clock. I sent for Dr. Thomas. He came, and after careful investigation he came to the conclusion on which he was ready to stand: agreeing cordially with me that it was fungoid growths. The uterus was curetted, hemorrhages ceased, and in a few days the woman was well, and is still living. I could tell of many cases where I have found his excellent judgment a help. Dr. T. G. Thomas has been a blessing to all, to physicians, and to patients. I only repeat the sentiment of many, that a good man, and a great surgeon, has gone from our midst.

MARY DIXON JONES.

New York, March 12, 1903.

## SOCIETY PROCEEDINGS.

## THE NEW YORK ACADEMY OF MEDICINE.

## SECTION ON GENITO-URINARY SURGERY.

Stated Meeting, held February 18, 1903.

John Van der Poel, M.D., in the Chair.

**Nephrectomy for Calculus.**—Dr. F. Tilden Brown presented a man, thirty-nine years old, a native of England, a clothing cutter, who was seen October, 1902. Family history negative. Personal history, negative except for gonorrhea fifteen years ago. About five years ago, albumin and pus were found in his urine, and he was told that his kidneys were diseased. He had no symptoms other than an occasional dull pain across his lumbar region, which he attributed to "catching cold." Four years ago while standing at work by an open window he had a severe pain in the right loin, which continued with varying intensity for three days, when he went to bed for two weeks. Felt feverish, but had no chills, vomiting or urinary symptoms. On recovering, worked regularly for a year, when he had a second attack lasting ten days. On this occasion the pain radiated to the bladder and right testicle, which swelled and was tender for several days. Then a period of six months before the third attack. After this the attacks became more frequent, and during the past eight months he has averaged one monthly, of varying severity. These have caused much loss of time at work, and he has been growing weak and losing flesh. On admission to the Presbyterian Hospital Dec. 11, 1902, he appeared poorly nourished, anemic. Thoracic organs negative. Abdomen—lean walls resist deep palpation, especially on right side, where this elicits tenderness, and there is a distinct sense of fulness. Temperature 99° F., pulse 90. Leucocytosis 9,000. Urine very turbid, acid; sp. gr. 1.015. Albumin, marked trace, urea two per cent., Indican, no excess. Total sediment almost wholly pus. Numerous bacilli resembling *Bacillus coli communis*.

Radiograph by Dr. Moseley showed a triangular shadow in region of right kidney base toward the spine. Suggested a calculus molded into a cast of the pelvis and some calyces.

With the presumption that a nephrectomy rather than a nephrolithotomy offered the best outlook for the patient further knowledge of the condition of the other kidney was clearly indicated. To secure this synchronous catheterization of the ureters was performed and gave from the right kidney: Four c.cm. in 16 minutes, reaction alkaline, albumin considerable, urea four per cent., blood, some cells, considerable pus, few hyaline casts, large bacilli bacteria, no tubercle bacilli; from the left kidney: Twenty-four c.cm. in 16 minutes, acid reaction, trace of albumin, six per cent. urea, no blood, small amount pus, few hyaline casts, large bacilli, no tubercle bacilli.

Cultures from bladder, right and left ureters, all gave growths resembling *Bacillus coli communis*, which gave Widal reaction, but did not coagulate milk or produce gas. Thus, while the right kidney was proven to be nearly functionless, the left was not free from infection.

On Dec. 15 under gas and ether anesthesia, an oblique lumbar retroperitoneal exposure of the right kidney was made. The organ was found to be very large, and with most of its surface tensely cystic. The fatty tunic had become in many places fibrous. The upper pole was at a high level and difficult of detachment. Through the tissues of the renal pelvis a calculus could be felt. To ligate the pedicle it was found necessary to diminish the size of the organ by evacuation of several of the large pyonephrotic sacculations,

when with semicollapsed walls the presence and branched form of the stone could be felt through the kidney; the ureter and vessels were ligated with chromic gut and the kidney removed without exposing the stone. Most of the parietal wound was closed in layers by chromic gut, a small cigarette drain being left in upper angle. The patient was in considerable shock after the operation, and two hours later received an intravenous salt infusion to which he responded well. For two days the temperature reached 101° F., then fell to normal, and so remained. The wound healed by primary union. There was no discharge until the fifteenth day, when a quite copious watery discharge of distinctly urinous odor appeared. To counteract by gravity this undoubted leakage of urine from the severed ureter, the patient was allowed to get up the following day. The small opening left for drainage in the upper angle closed in rapidly with only an occasional indication of a slight recurrence of this reverse ureteric leakage from the bladder. He left the hospital on Jan. 10, 1903. At the present time the urine is perfectly clear, acid, sp. gr. 1.023, no trace of albumin. Since the urine is of a much better quality than was the urine obtained by catheter from the left kidney before operation, it must be inferred that removal of the diseased organ has been instrumental in effecting this benefit. In regard to leakage from the ligated ureter, it is probable that such an occurrence is unlikely to occur, even with slipping or early absorption of the ligation, when the sphincter and tissues bounding the uterovesical mouth are normal. Nevertheless it seems to the writer that greater precautions to secure permanent occlusion of the ureter may well be taken in all cases than has hitherto been his custom. For in cases of nephrectomy for tuberculosis even a minimal leakage of this sort may be attended with a serious fresh inflammation of tuberculosis in the retroperitoneal tissues. He would suggest that either a long curved and blunt syringe tip by which several minims of a strong carbolic acid solution could be deposited upon the mucous surface of the ureter for an inch or so below the severed end, and before the ligature is secured, or also, that a fine-pointed cautery be used for the same purpose. In this way an occlusion of the lumen of the mucosa will result independent of what the temporary ligation may accomplish, and the ligated stump be disinfected at the same time.

The calculus, which was firmly imbedded in pelvis, and two of the upper calices, weighed ten grams, and consisted chiefly of uric acid, with a moderate oxalate of lime admixture.

**Case of Nephrolithotomy.**—Dr. Brown also presented this patient, a man twenty-eight years old, white, American, by trade a cooper. First seen Dec. 29, 1902. Family history negative, uses alcohol and tobacco in moderate quantity. Usual diseases of childhood, good recoveries. Gonorrhea ten years ago, cured in four months. Never received any injuries involving the trunk.

About seven years ago patient began to experience sudden sharp pain in the right side radiating across the abdomen, down the right thigh and into right testicle. These were felt at intervals varying from three or four days to eight months. Sometimes accompanied by chilly sensations, slight fever and vomiting. The attacks lasted from a few minutes to several hours. About four years ago, after a very severe paroxysm, he entered a hospital and was observed by both medical and surgical staff without a diagnosis. Five weeks later he returned to work, but had soon to give up on account of the frequent recurrence of the former sort of attacks. Three years ago he entered another hos-



pital for what was diagnosed as appendicitis. One month after appendectomy he was discharged cured. On reaching home the old attacks began again. Patient reentered the hospital again with his physician's diagnosis of renal calculus, but this was not concurred in by the surgeon, and he was discharged. For the past year attacks have been increasing in frequency and severity, and have often been followed by bloody urine. On one occasion, he claims to have passed three or four ounces of pure bright blood. He has never noticed any long worm-shaped clots corresponding to ureteral casts. Nor has he ever seen any urinary gravel. Two months ago Dr. E. G. Janeway diagnosed renal stone. A few days after Mr. Caldwell took an excellent radiograph showing a small but well-defined shadow in the region of the right kidney. He entered my service in Bellevue Hospital for operation on Dec. 29, 1902, complaining of considerable general soreness since the last acute attack a few days ago. On palpation neither kidney could be felt, but the lumbar and abdominal boundaries of the right kidney were very tender. Urine examination Jan. 2 gave a clear, pale-yellow alkaline. Sp. gr. 1.018, no albumin, no sugar. Microscopical examination showed phosphates in excess, no blood or pus. On Jan. 4 patient had a sharp attack of pain in the right side, and a few hours later passed several ounces of blood-stained urine. Under ether anesthesia, Jan. 9, the right kidney was exposed by an oblique lumbar incision; in a few places the adipose capsule was unusually adherent to the fibrous capsule. An accessory artery going to the upper pole was clamped and tied before drawing the kidney out of the wound. Palpation of the organ, its pelvis and upper part of the ureter, both before and after delivery of the organ, upon the loin failed to detect the slightest suggestion of the presence of a calculus. A small slit was made in the ureter at its junction with the pelvis, and a long flexible ureter catheter passed to the bladder. This slit was subsequently closed by chromic gut sutures. The fibrous capsule was then cut at a point a little posterior to an intersection of the vertical and transverse planes, and blunt pointed scissors advanced into the pelvis. A curved artery clamp was then substituted the better to reach into the several accessible calices. On turning the point toward a calix well in the upper pole of the kidney a stone was detected. The forceps were replaced by the finger, which, after some little difficulty, dislodged the body from its quite firm imbedment, and it was brought out in a small scoop. Sharp bleeding followed from the kidney wound. Three or four catgut sutures were used to coapt the kidney laceration at different levels, and the organ was replaced. A small but long cigarette drain was placed at the posterior surface of the kidney to serve as a lead for subsequent urine and blood oozing. The parietal wound was closed in layers with chromic gut, except at the upper extremity. Thick dressings to provide for urine leaking were applied. Patient returned to ward in good condition. Blood stained dressings with much urine admixture were changed daily for five days. During same time the urine voluntarily voided by bladder was heavily charged with blood. After the sixth day, when cigarette drain was removed, the issuance of urine by the loin rapidly lessened. The stone weighed 0.564 gram, was the shape of small lima bean and consisted of calcium oxalate with slight organic admixture.

Dr. Eugene Fuller said that no doubt the X-ray had been of great value in making a diagnosis of the cases reported by Dr. Brown, but we should remember that sometimes, in stone cases, the X-ray will give negative results even when the shadows are well taken. Some time ago he had removed from a bladder seventeen

faceted stones, the mass being about the size of a hen's egg. An X-ray had been taken in this case, and the patient had been informed that he had no stone, because there was no shadow as the result of the X-ray. Obtaining a shadow in these stone cases greatly aids in the diagnosis, but the surgeon should be on his guard against positively asserting that no stone exists, because no shadow has been revealed in an X-ray picture.

Dr. Van der Poel believed that distinct advances had been made in the obtaining of X-ray pictures, giving more definite conclusions, during the past five or six months. Although he was not personally very conversant with radiography, yet Dr. Alexander B. Johnson had showed that there was a great deal of difference with regard to the manner of taking the radiograph, as to placing the plates, and upon the technic often depended the obtaining of positive or negative results.

**Torsion of the Spermatic Cord.**—Dr. Eugene Fuller gave the history of a man, thirty-five years old, who during the last four years had had such attacks, sometimes three times a year, and sometimes as many as five or six. These attacks came on suddenly, and were accompanied by so much pain in connection with the right testicle that he was compelled to take to his bed, lying perfectly flat, with hips elevated, applying sometimes cold and sometimes hot applications. With each attack the right testicle swelled. Upon examination nothing appeared to be abnormal. He had been examined by several men and all pronounced him perfectly healthy. He had another attack in his hotel and Dr. Fuller was sent for. The doctor found him lying flat upon his back and, upon examination, the right testicle had rotated and become extremely tender. Upon rotating the testicle so as to increase the torsion, the pain was augmented; rotating it the other way gave him relief. Two and a half rotations represented a degree of torsion. The case was very interesting, and was analogous to the one Dr. John Van der Poel reported in 1895. Nicholodane reported the first instance of complete rotation with strangulation of the testicle in 1885. In most cases where complete strangulation of the testicle had existed the diagnosis had first been made when an operation for supposed strangulated hernia had been undertaken, a gangrenous testicle being found instead. In 1893 Nash was called to see a boy who had been playing football, and he noted the condition of the testicle before gangrene had set in. He untwisted the torsion. That was the first case reported where relief by so doing had been effected. In this case the twist was so acute that gangrene would probably have followed. In neither of the cases of Dr. Fuller or Dr. Van der Poel would gangrene have followed.

**An Illustration of the Reckless Manner in which the Testes have been Removed for Relief of Prostatic Symptoms.**—Dr. Eugene Fuller related the instance of a patient, thirty-seven years old, who had suffered two years previously from castration, which was undertaken for the relief of prostatic hypertrophy, when really he was suffering from an extensive false passage which extended from the floor of the membranous urethra down anterior to the prostate, and between that gland and the rectum. The cavity formed by this false passage was very extensive, and lined with granulation tissue. A perineal section was performed, and the line of the false passage laid open, after which the cavity was curetted and packed with gauze, a cure resulting.

**Tuberculous Epididymitis of Special Interest as Regards Treatment.**—Dr. Eugene Fuller reported the case of a man, about thirty years old, apparently in good general health, who came to the clinic at the



Post-Graduate Hospital complaining of so much pain in the left testicle that he was unable to work. He denied the history of gonorrhea. Examination showed in connection with the globus minor of the left epididymis a very hard nodule, the size of a small marble. The nodule was not painful on manipulation. The surrounding tissues were non-adherent, and there was no involvement of the rest of the genito-urinary tract. The question arose what to do for the man. It seemed incredible that he should suffer so much pain. It was decided to place him in a ward and take out the mass. This was done, and the mass was proven to be tuberculous, and to consist of a pyocoele with thick, firm walls. The tuberculous abscess was dissected out and removed; its fluid contents were found to be in a state of great pressure, thus accounting for the pain of which the patient complained. The confined pus would, of course, after a time have broken through the walls of the nodule and infiltrated into the surrounding tissues, giving spontaneous relief to the pain. The existence of the great pain made the case an interesting one. If the man had not been a laborer, and so forced to get back quickly to work, Dr. Fuller would not have felt called upon to operate so precipitately. In most such instances, presenting similar nodules, resolution follows expectant treatment; no operation being required.

Dr. Van der Poel said that the case reported by him in 1895 (*Med. Record*, Vol. 47, No. 24) was very similar to that of Dr. Fuller. The patient was a young physician, twenty-five years old, who gave the following history: His father, also a physician, had told him that his right testis was undescended at birth, but had come down to beyond the external ring by the time he was two years of age. When twenty-two years of age he experienced an acute pain in the right testicle, coming on suddenly, without apparent cause (strain or exertion). The suffering was so intense that he was obliged to assume a recumbent position, when hot applications were made without relief, but after "holding it up" toward the ring, for about a half hour, the pain gradually ceased. From this time on, for three years, attacks came on with varying frequency, from twice in one night on two occasions, to once in six months. When twice in one night, it is probable that the twist was not entirely released at the first attack. When not understanding the nature of the trouble, relief was obtained by "pulling, or stroking the cord upward," evidently relieving the tension sufficiently to allow the cord to untwist to a certain extent. Most of the attacks, however, came on when up and about, and when the probable nature of the trouble was explained to him, after several trials to ascertain the direction of the twist, relief was obtained usually in about two minutes. Two full turns were made, from within outward, before the testicle apparently resumed its normal position, and the pain ceased, the torsion being from without inward. When Dr. Van der Poel first saw him he had not had an attack for six months. Upon examination, the right testicle was found well drawn up toward the upper part of the scrotum, while the left was unusually low. Three half-turns of the testis could easily be made, without any pain or discomfort whatever, but on another quarter-turn (one and three-quarter full turns) there was pain accompanied by swelling of the veins of the cord, and if the testis was left to itself, it would remain in this position, but could be readily untwisted. Upon the same side was an incomplete inguinal hernia of small size.

The majority of these cases appear to have occurred upon the right side, and, as in this case, with the testicle rather high in the scrotum, in fact, no case has been recorded with a low testis. The twists have mostly

been where mentioned, from without inward. The degree of torsion necessary for strangulation has varied from one-half turn (in Keen's and Nash's cases) to two full turns in this case, and in one other, as far as I am aware. The anatomical explanation of these torsions lies in the fact that the usual fixation of the testicle by a peritoneal reflex, or mesorchium, is either absent, or but slight, so that the testis hangs as it were, on a pedicle, which at any rate is not fixed for some distance, the peritoneal reflex always being present.

Dr. J. A. Bodine had had one experience in a case of torsion of the spermatic cord, in which the cause was definitely known. It was produced by the ordinary traction employed for holding up the cord in performing a Bassini operation by strips of gauze. The cord so held up became twisted on its long axis, and was replaced in a condition of torsion. Pain occurred within 48 or 72 hours, and relief followed the untwisting of the cord.

**A Case in which both Testes Passed into the Scrotum through One Inguinal Canal.**—Dr. A. A. Berg presented this patient. (This paper will appear in a subsequent issue of the *MEDICAL NEWS*.)

**Pneumococcus Infection of both Tunicae Vaginales, with Metastatic Infection of Retzius' Space.**—Dr. A. A. Berg reported the clinical history of a patient with bilateral empyema of tunica vaginales, due to the pneumococcus of Friedländer, with secondary abscess in the cellular tissue behind the bladder, burrowing up through the left inguinal canal, and emerging at left of external ring. The case was reported as an instance of what seemed to be a primary infection of both tunicae vaginales by the bacillus of Friedländer. Although the urine contained some pus cells there were no clinical evidences of a cystitis. As to how he was to interpret the abscess around the left seminal vesicle, that finally made its way up along the vas, and pointed at the external ring, was an open question. The left epididymis was involved by continuity in the suppurative process; the infection may have passed up the vas, and become localized around the seminal vesicle, and then burrowed upward along the vas; or the infection around the vesicle may have been a metastatic one; or, finally, it may have been carried to the vesicle by the lymphatics of the cord. This case will be published *in extenso*, with bacteriological findings, later.

**Case for Diagnosis.**—Dr. R. J. Litsit presented a man, twenty-nine years old, a sailor. Family history very good. He never had gonorrhea. He had never been sick. In 1897 he contracted an ulcer on his penis, after a period of incubation of about six days. The ulcer persisted for about one month and, according to the patient's statement, became indurated. The whole penis became greatly swollen four days after the ulcer appeared, and buboes formed on either side. The swelling and buboes disappeared after twelve days. Nitrate of silver was applied to the ulcer; this was followed by iodoform application. Fifteen days after the ulcer appeared a rash came out on chest, thighs and arms. This remained for thirty days and then disappeared. Eight days after the rash appeared the patient had a sore throat which lasted about one month. His physician pronounced it a case of syphilis and inunctions of mercury and some medicine which tasted bitter and salty, was administered. One year after the appearance of the ulcer the testicles began to enlarge and became very hard. A sinus appeared the last week in December. No pain was ever experienced. The prostate was normal. The doctor first saw him February 1, and the patient was given  $7\frac{1}{2}$  grains of iodide of potassium three times a day, and inunctions of mercury, 15 grains daily.

Dr. B. Lapowski said that the diagnosis of the case

was written upon the skin. The presence of a tubercular serpiginous syphilide above the right knee excluded all doubt as to the character of the disease of the testicles. The unsatisfactory results from the administration of iodide of potassium were rather due to the small doses. He said that larger doses, 25 or 30 drops of a saturated solution of iodide of potassium, given three times a day, together with a series of mercurial inunctions, would quickly reduce the size of the affected testicles.

**Improvement on Levis' Carbolic Treatment for Hydrocele, with Cases.**—Dr. J. A. Bodine said that the feature that he had added to the Levis method, which he considered an improvement, consisted in running a stream of salt solution through the hydrocele sac, until the escaping fluid contained no albumin. The sac was then free from hydrocele fluid and the inner layer of the tunica vaginalis was mechanically cleansed of its albuminous coating, permitting the carbolic acid to come in contact with the lining endothelium. The faults in the Levis method were (1) the sac could not be completely emptied of hydrocele fluid with the trocar and canula at present used. An amount of fluid equal in greatest depth to the length of the end of the canula projecting into the sac will remain. (2) The chemical incompatibility between carbolic acid and albumin in solution. So sensitive was this reaction that it was used in pharmacy as a differential test between carbolic acid and creosote. Hydrocele fluid and carbolic acid formed a thick, yellowish-white coagulum. Therefore, it was necessary to remove all the hydrocele fluid before the carbolic acid could exercise its full curative or caustic effect upon diseased membranes. He showed a trocar and canula devised by Dr. Frederick Griffith, which made easy this mechanical cleansing of the hydrocele sac. It consisted of a trocar sufficiently long to accommodate two canulae. The lower canula had a slit which was important in completely recovering the salt solution. A spot at lowest level of the tumor was cocaineized, and the trocar introduced. Its point was guided in front of testicle to a spot previously cocaineized at the upper pole of tumor and pushed through. The trocar was withdrawn, leaving the two canulae in position. The rubber tube of an irrigator containing warm salt solution was attached to the lower canula, the fluid permitted to escape from the upper. At periods some of the escaping fluid was caught in a test-tube and tested for albumin. In some cases as much as a half gallon of salt solution passed through the sac before it was entirely cleansed of albumin. The irrigation was stopped and the sac completely emptied of the salt solution. From one to two drams of Calvert's liquefied crystals of carbolic acid were introduced through the lower canula by means of an ordinary hypodermic syringe and a small connecting piece of rubber tubing. The sac should then be so manipulated as to bring the acid in contact with all parts of the tunica vaginalis. The salt solution was again connected with the lower canula, and the stream continued until the escaping fluid contained no trace of carbolic acid. This was readily tested by adding some of the hydrocele fluid reserved for this purpose. If carbolic acid was present coagulation occurred. Lastly, the sac was completely emptied of salt solution, the canulae withdrawn and the punctures sealed with collodion. As the curative effect of carbolic acid on the endothelial lining is instantaneous upon its application, there was no advantage in leaving any excess of acid in the sac. If the sac is free from fluid, carbolic acid could not produce intoxication, because it could not be absorbed. Diluted carbolic acid is a more dangerous application than the acid in its full strength. The one

can be absorbed, but the other coagulated and sealed up the mouths of the lymphatics, thus automatically obstructing its distribution. During the past year he had used this method on nine selected cases, five of which he had been able to trace up to the present report cured.

Dr. Wm. B. Coley thought the method described by Dr. Bodine a very ingenious one. He called the attention of the Section to a method which he had brought before the Surgical Society by which he had treated 55 cases at the Hospital for Ruptured and Crippled. This was a far simpler method, and consisted of a double canula, a smaller one which fitted in a larger one, the latter being used as a trocar. The scrotum was so manipulated that every drop of fluid was expelled. Two drops of Schering's pure carbolic acid was introduced, and the scrotum so manipulated that they were well spread about over the endothelial surface. Although two drops of the acid seemed to be a very small amount, yet, in his experience, it was sufficient to cure. In one of his cases, a man sixty-two years old, the hydrocele had existed for 40 years and contained eight ounces. He had been frequently tapped. He was cured by one injection of only  $2\frac{1}{2}$  minims of Schering's carbolic acid, and had now been well for two years. The majority of the cases required but one or two injections.

**Tumors of the Testis.**—This paper was read by Dr. William B. Coley. The writer stated that he had observed 18 cases of tumor of the testis, of which 17 were sarcoma and one teratoma. He said that, contrary to the opinion of Butlin, it occurred frequently in young adult life, more than half of his own cases being between 20 and 30 years of age. With reference to the etiology, it was his belief that trauma played a very important part. In about 50 per cent. of his cases there was a distinct history of antecedent injury. In some of these cases the tumor developed so quickly after the injury that there could be no question as to the etiological significance of the trauma. He also referred to the very complete statistics of Kober (*Amer. Journal of the Medical Sciences*, 1899, Vol. 117, p. 35) covering a series of 105 cases of sarcoma of the testis collected from the literature, in which there was a history of antecedent injury in 43 per cent. of the cases. In all of his cases the type of tumor was round-celled sarcoma. As regards the diagnosis, he said that, as a rule, it was not difficult to differentiate malignant tumor of the testis from other diseases, the condition most closely simulating it being tuberculosis of the testis. Yet, in most instances, a careful study of the clinical history and physical characteristics made the diagnosis clear. A history of short duration of the trouble, antecedent injury, smooth symmetrical enlargement, absence of involvement of the skin, no enlargement of the cord, with no family history of tuberculosis or evidence of tuberculous disease in other parts of the body, he stated, would usually permit one to make the diagnosis of sarcoma.

The writer mentioned one case in which all of these positive signs were present, and yet the diagnosis of tuberculosis was made solely on the ground of the varying consistence of the tumor. The testis was removed and proved to be tuberculous. With regard to the prognosis, he never had seen a case of malignant disease of the testis recover under any method of treatment. Kober's statistics, comprising 105 cases, however, show that nine remained free from recurrence from 3 to 15 years, giving a percentage of cures of 8.5 per cent., being a lower rate than in almost any other variety of sarcoma, except periosteal sarcoma of the femur. In most cases the duration of the disease is comparatively short; in 71 of Kober's cases it was less than two



years; in 28 from a few weeks to six months. In only one-fourth of the writer's own cases was the patient seen in the early stages of the disease, the remainder having been treated for recurrence at varying periods after castration.

As to treatment, he strongly advised very early operation with complete removal of the testis and cord as high up as the internal ring. He thought that the only hope of better results rests upon earlier diagnosis, and he condemned the practice of delaying for weeks or months while trying the effects of mercurial ointment or iodides, as is so frequently advocated by text-books and surgeons. He stated that in the great majority of cases the diagnosis could be made in the early stages; and in cases of doubt, in view of the great dangers of delay, he advised early exploratory operation with section of the tumor and castration if the suspicions of malignant disease were confirmed. The patient with teratoma, whom the writer operated upon 2½ years before, was still in good health, and was shown before the Society. He stated that while pathologists are inclined to classify this variety as a benign growth, not infrequently recurrence and metastases do occur.

Dr. John F. Erdmann referred to the work of Dr. John B. Roberts, of Philadelphia, who stated in a paper upon this subject that he advocated the removal of the glands along the iliac vessels, making a very extensive operation, even requiring a secondary median incision in the abdominal cavity as being necessary to the removal of the growth.

Dr. A. A. Berg wished to emphasize two points (1) the presence of glands associated with sarcomata, and (2) the fact of the great malignancy of tumors of the testes. He remembered five cases operated upon at the Mt. Sinai Hospital during the last three years, and all died. The operations were very extensive, the inguinal canal being opened, the inguinal and femoral glands being removed, etc. In two cases recurrences took place before the patients left the hospital.

Dr. B. Lapowski said he would refer only to the points mentioned by the reader. In cases of tuberculosis of the testis, where the other genito-urinary organs were visibly and palpably normal, an examination of the semen may sometimes reveal the presence of the tubercle bacilli, and thus give a valuable hint in regard to the diagnosis.

As to the writer's statement that he condemns the application of specific treatment advocated by writers in doubtful cases of tumors of the testicles on account of the loss of time for surgical action, so valuable in cases of malignant tumors, his condemnation could hardly be accepted. In many cases there was absolutely nothing of a characteristic nature which could guide the physician in his diagnosis, neither the presence of previous history, nor the aspect of the tumor, which would entitle him to any positive conclusion. If in such cases the physician would act upon the writer's advice, he would often remove testicles which could surely be saved by an antisymphilitic treatment. Cases of such malignancy as mentioned are of very rare occurrence and, in such cases, even an early operation was hardly ever followed by a permanent cure.

Dr. Wm. B. Coley said that he did not mean to say that he advised amputating doubtful tumors of the testes. In cases of doubt, careful clinical methods of diagnosis should be employed to make the nature of the growth fairly certain without an exploratory operation. Incision into the testes must certainly clear up the diagnosis and make unnecessary the removal of the testes unless we are practically certain that they are malignant. In the cases shown this evening of syphilitic testes, the long duration, the absence of any his-

tory of injury, and the characteristic physical signs, were so clear, that he did not see how they would be mistaken for sarcoma.

With regard to the question of trauma he thought it might be explained as one explained it in connection with tuberculosis. A child may fall and injure his knee, and there develops a tuberculosis of the knee. The trauma caused a lowering of the resisting power in that locality, giving a favorable nidus for the tubercle bacillus to develop. This probably holds true in the development of malignant disease.

## SOCIETY OF ALUMNI OF BELLEVUE HOSPITAL.

*Stated Meeting, held March 4, 1903.*

The Vice-President, John F. Erdmann, M.D., in the Chair.

**The Treatment of Itching.**—Dr. E. B. Bronson presented a paper on this subject. He said that two facts in the pathogenesis of itching were to be considered: hyperesthesia and the surcharge of nervous excitement. In a large proportion of cases the treatment must be based upon general principles. It was natural for every animal to attempt to relieve itching by scratching. How was this relief brought about? The act of scratching tended to divert the engorgement of the skin into other channels, and for the instant the accumulated nerve excitement was dissipated. However, the resulting hyperemia would probably do more than offset the temporary diversion which the scratching afforded, and, as a result, the nervous excitement was increased. It was possible to secure the same amount of relief in safer ways. All irritating contacts should be scrupulously avoided, such as from coarse clothing, excessive dryness or scaldiness of the skin, sudden changes of temperature. Ichthyol, resorcin, tar, benzoin and sulphur preparations would relieve the hyperemia, and had a decidedly healing effect on catarrhal inflammation, but they were not true antipruritics. Firm pressure on the itching surface would sometimes give almost as much relief as would scratching. Vinegar lotion, lemon juice, cologne water, camphor and chloroform in various solutions all acted in this way by producing more or less stinging or smarting of the skin, thus substituting a more definite sensation for the vague one of itching. Menthol relieved itching as it relieved pain by substituting for these sensations a disturbance of the temperature sense, and producing a sensation of cold. This drug might be used in ointment, in oily solution or as a dusting powder, but it was most effective in two-per-cent. alcoholic solution. It could be used very freely if there was not too much inflammation. Thymol and chloroform were useful adjuvants, particularly in urticaria. Hot water, when applied for a certain length of time, was decidedly sedative, and was especially useful in itching of the genitals. He had not found the use of opium, belladonna, stramonium and others of the same class of much benefit. The action of cocaine and of orthoform on the intact epidermis was nil. Tannic acid was useful when used in connection with menthol. It was the property of certain antiseptics, such as carbolic acid and mercuric chloride to retard vital action. The concentrated solutions of these substances produced decided anesthesia of the skin. Of all local antipruritics carbolic acid was the most reliable, and had the most lasting effect. The danger of absorption and carbolic acid poisoning was not very great, if ordinary caution were exercised. The danger of injury to the skin from its corrosive action was greater. This action could be neutralized to some extent by the addition of alcohol, but he had found



linseed oil the best corrigent. The following prescription was well adapted for use over limited areas of pruritus, but should not be used oftener than once a day: Liquor potassae, one dram; carbolic acid, two drams; linseed oil, one ounce; oil of verbena, two minims. The best time to apply it was at night.

Aside from general medication addressed to the special requirements of individual cases, there was not much to be said about internal medication in cases of pruritus. The condition could be temporarily relieved by narcotics, but when the narcosis passed off the itching was apt to be worse than before. Antipyrine had been used with some success in itching, but it must be employed in large doses, and it often gave rise to rashes. Such general sedatives as the bromides were often useful, and at times almost indispensable. In urticaria there was an indication for motor depressants to overcome the spastic contraction of the skin muscles. Atropine was a recognized remedy when given in large doses, but he would not often resort to it. The same was true of pilocarpine. In chronic toxic urticaria there was an indication, for antiseptics, such as creosote and the salicylates. Where the urticaria followed an error of diet or the administration of some special drug speedy relief usually followed a brisk purgative.

In cases of senile pruritus associated with eczema the attention should be mainly directed to the eczema, but when there was no eczema harsher methods of treatment were indicated, such as vigorous rubbing of the skin, faradization with the metallic brush and the internal use of cannabis indica. Strychnine was also an appropriate remedy. For those subject to winter pruritus the diet should be carefully regulated, and the parts kept warmly clad. Points of excoriation should be carefully covered with some healing salve, and some soothing ointment, such as cold cream, should be used after the bath. Bath pruritus was hard to treat. A superfatted soap should be used in the bath, and after the bath the skin should be lightly dried with the softest towels.

In the localized forms of pruritus occurring about the anus the underlying constitutional conditions should be carefully sought for. When inflammation was also present this must first be controlled, and then a more efficient antipruritic used. Cocaine was sometimes indispensable when the itching was intense, but it was not a good remedy for prolonged use, and was only of value on the mucous membranes or on abraded surfaces. The same was true of orthoform. Applications of hot water were sometimes very beneficial, the temperature of the water being gradually raised to 110° F. The sovereign remedy was carbolic acid. A single application of the strong oil already mentioned would sometimes give complete relief for the entire night. The principal seat of the itching in these cases was just at the junction of the mucous membrane and skin, and the application should be confined to this portion. In the milder forms a five-per-cent. solution of menthol in oil or a watery solution of ichthyol, one dram to the ounce, would be found of benefit.

Dr. George W. Crary referred to a case in which marked pruritus ani was associated with, and was relieved by sexual orgasm, an excellent example of the substitution of voluptuous sensation for itching.

Dr. J. W. S. Gouley said that about eighteen years ago an old physician had told him that it was his practice to relieve the burning and itching sensation of acute erysipelas by the application of lemon juice and vinegar. The speaker said that he had accordingly suggested the use of a ten-per-cent. solution of glacial acetic acid on the erysipelas cases in Bellevue Hospital, and the reports from the internes extending over many

years were to the effect that this application gave very marked relief in the majority of cases.

Dr. Bronson said it had never occurred to him that the vegetable acids acted chemically in the relief of pruritus, but rather as a means of substituting another sensation. Acids were sometimes used internally on the assumption that there was an excessive alkalinity of the blood, but it was more probable that the mineral acids employed in these cases acted by increasing metabolism.

**Notes on the Selection of a Climate for the Treatment of Tuberculosis.**—Dr. Russell Bellamy was the author of this paper. He said that there were one thousand hours less sunshine in New York city than in Denver, and 48 per cent. of sunshine as compared with 82 per cent. in Arizona. He believed a physician in this city erred when he attempted to treat here incipient cases of pulmonary tuberculosis which might be sent to a more suitable climate. The Adirondack region was made moist by the proximity of the valley of the St. Lawrence. The Saranac and Lake Placid regions were to be specially commended. Raybrook was also a good place, but was too near civilization. Asheville seemed to him overcrowded and possessed of comparatively little sunshine. El Paso, Texas, was becoming quite a popular resort for the winter, especially for cases of laryngeal tuberculosis. The ideal vantage ground was to be found in Colorado, New Mexico and Arizona. In Colorado was found the highest development of the Rocky Mountain peaks. The eastern part of the State was a vast plain with an average elevation of 4,500 feet. The northwestern part of Colorado was the land for boys and girls of fifteen or sixteen. In these "parks" the air was heavily impregnated with the vapors from the pine and spruce trees, and the air was delightful and invigorating in summer. This portion was now only accessible by pack trains. The elevation was from seven to eleven thousand feet. In the winter the precipitation was almost wholly in the form of snow, and this was apt to last into May. There were no fogs. Denver possessed a record of 42 per cent. of clear days, as against 27 per cent. for New York city. Colorado Springs, in the opinion of the speaker, offered the greatest advantages for the pulmonary invalid of any place in this country. The elevation was 6,022 feet. The population was 25,000, and the life there was most delightful, but the locality was more especially suited for those of considerable means. Manitou Springs, a nearby place, was not so good. New Mexico was generally mountainous to the Arizona line. The climate was generally temperate, and the rainfall occurred chiefly in July and August, the average being about 18 inches. The wind movement was less than in Colorado. The natives seemed to be entirely immune to consumption. The best part was the northern portion. The winter climate of Albuquerque was superb, but it was too hot in summer. The temperature during the winter was 45° F. at noon, while in summer it was rarely over 80° F. Silver City was at an altitude of 5,000 feet, and appeared to be particularly suitable for pulmonary invalids, except that the accommodations were rather crude. Las Vegas was also a good place. Phoenix and Tucson were the principal places in Arizona, a territory which appeared to him almost as monotonous as Egypt. There was a total absence of fog, and the sunshine was most brilliant. Elderly people and advanced cases of tuberculosis not already accustomed to high altitudes, should avoid great elevations.

Mr. H. T. Galpin, an expert chemist on the control, by artificial means, of climatic conditions, was asked to speak. He said that his work in governing temperature and humidity had taught him that New York was

a most difficult place to manage in this respect. There was an annual mean last year of 53.5° F., and a maximum of 90°. The annual mean for humidity was 75.5 per cent., and per month, 82. He believed that electricity was the most useful means of generating ozone, and that the latter was one of the best purifiers of the atmosphere. He had devised an apparatus which gave three or four per cent. of ozone, and with this he was able to rapidly oxidize and purify any contaminated atmosphere. In almost all buildings, particularly fire-proof ones, there was a constant dampness present, as shown by the fact that no highly polished and unprotected steel surfaces would remain long without rusting. The decomposition of water in the presence of the oxygen and nitrogen of the contaminated atmosphere of offices and dwelling houses resulted in the formation of ammonia and carbon dioxide. When these were brought in contact with ozone they were rapidly oxidized, and the natural form of oxygen and nitrogen restored. If a constant temperature or humidity could be maintained the conditions thus obtained would be the best for the preservation of food products, and he believed the same was true with regard to the health of human beings. He had known of incipient cases of pulmonary tuberculosis in which the tubercle bacilli had been rapidly reduced in number by this method of purification of the atmosphere. When the atmosphere was dry and there was a good average temperature and humidity, and a good altitude, there was considerable electricity in the air, and also ozone, and these tended to keep the air in a state of purity. He had never been able to find ozone in the atmosphere of New York city, although he had had no difficulty in finding H<sub>2</sub>S and other noxious gases. He had found the rainfall here in one year to be 58.68 inches, and this humidity of the atmosphere alone made it difficult to keep the air pure. The only accurate method of determining the humidity was by means of a sling cyclometer.

### BOOK REVIEWS.

**SPECTACLES AND EYEGLASSES, THEIR FORMS, MOUNTING AND PROPER ADJUSTMENT.** By R. J. PHILLIPS, M.D., Ophthalmologist Presbyterian Orphanage, etc. Third Edition. Revised. With 52 Illustrations. P. Blakiston's Son & Co., Philadelphia.

THE matter and make-up of this little volume of 109 pages are good, and make of it a good working manual, justifying its reappearance in a third edition. Various kinds of information needed for the mechanical side of this work are got together here in compact, available form, without unnecessary detail. It is an essentially practical treatment of the subject without much reference to theory, though interest in the book is awakened by its historical setting in the introduction.

**REGIONAL MINOR SURGERY.** Describing the Treatment of those Conditions Daily Encountered by the General Practitioner. By GEORGE G. VAN SCHAICK. International Journal of Surgery Co., New York.

THE author of this book is correct in claiming that it is often the little things in surgery that go to distinguish the gifted operator from the bungler. Cosmetic results also bring credit. Failures to produce sightly members, or slight scars about the face, for example, are often a disgrace, and may become the basis of a civil suit.

As might be expected, such a book begins with the conditions of asepsis, and the essential, yet often neglected rules of suturing, and then takes up in careful series all of the surgical areas of the body, from the head

to the rectum. A rather important branch of minor surgery, which might at any time embarrass the general practitioner, is the subject of foreign bodies in the genito-urinary system of the male and of the female. The frequency with which children, and even some adults, trifle with themselves makes it necessary that every practitioner should understand the best accepted methods for relieving these conditions. For the purpose which the book aims to reach it is certainly adequate. The plates, while not of a high order of individual execution, are clear and to the point, and serve throughout to add to an interesting book.

### BOOKS RECEIVED.

*The MEDICAL NEWS acknowledges the receipt of the following new publications. Reviews of those possessing special interest for the readers of the MEDICAL NEWS will shortly appear.*

**COMPEND DISEASES OF CHILDREN.** By Dr. M. P. Hatfield. Third edition. 12mo, 241 pages.

**INORGANIC CHEMISTRY SYLLABUS.** By H. C. Carel. Third edition. 8vo, 182 pages. Minneapolis.

**OBSTETRICS.** By J. W. Williams. 8vo, 845 pages. Illustrated. D. Appleton, New York and London.

**HOW TO SUCCEED IN THE PRACTICE OF MEDICINE.** By Dr. Joseph McDowell Matthews. 8vo, 215 pages. Illustrated. John P. Morton & Company, Louisville.

**ANATOMY OF THE PERITONEUM AND ABDOMEN.** By Dr. Geo. S. Huntington. 8vo, 292 pages. Illustrated. Lea Brothers & Co., Philadelphia and New York.

**MANUAL OF BACTERIOLOGY.** By Drs. R. Muir and James Ritchie. American edition by N. M. Harris. 8vo, 564 pages. Illustrated. Macmillan & Co., New York.

**PHYSIOLOGY.** By Drs. T. G. Guenther and A. E. Guenther. 12mo, 255 pages. Illustrated. Lea Brothers & Co., New York and Philadelphia.

**DISEASES OF METABOLISM, NUTRITION AND OBESITY.** By Dr. C. v. Noorden. 12mo, 59 pages. NEPHRITIS. 112 pages. E. B. Treat & Co., New York.

**AMERICAN YEAR-BOOK OF MEDICINE AND SURGERY.** 8vo, 671 pages. Illustrated. W. B. Saunders & Co., New York, Philadelphia and London.

**THERAPEUTICS OF INFANCY AND CHILDHOOD.** By Dr. A. Jacobi. Third edition. 8vo, 560 pages. J. B. Lippincott Co., Philadelphia and London.

**SURGICAL DISEASES OF THE KIDNEY AND URETER.** By Dr. Henry Morris. 8vo. Two volumes. W. T. Keener & Co., Chicago.

**OBSTETRICS.** By Dr. W. P. Manton. 12mo, 265 pages. Illustrated. Lea Brothers & Co., New York and Philadelphia.

**THE PRACTICAL MEDICINE SERIES.** Vol. 3. EYE, EAR, NOSE AND THROAT. Dec., 1902. 12mo, 283 pages. Year Book Publishers. Chicago.

**HEATH'S PRACTICAL ANATOMY.** Edited by J. E. Lane. Ninth edition. 666 pages. Illustrated. P. Blakiston & Co., Philadelphia.

**DISEASES OF THE SKIN.** By Dr. H. Radcliffe Crocker. Third edition. 8vo, 1400 pages. Illustrated. P. Blakiston's Son & Co., Philadelphia.

**THE INTERNAL SECRETIONS AND PRINCIPLES OF MEDICINE.** By Dr. C. E. Sajous. Vol. I. 8vo, 800 pages. Illustrated. F. A. Davis Co., Philadelphia.

**TEXT BOOK OF PRACTICAL MEDICINE.** By Dr. W. G. Thompson. Second edition. 8vo, 1014 pages. Illustrated. Lea Brothers & Co., New York and Philadelphia.